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BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN.

Vol. 39.] 1942. [No. 10.

SUMMARY OF RECENT ABSTRACTS.*

VIII. TYPHUS GROUP OF FEVERS.

Proteus OX19 type. Vectors: louse and flea.

Louse-borne.—Epidemic, louse-borne typhus follows war, famine, mass movements of population, and disturbances of political stability. It is spreading during the present war, and the following table (extracted from the fuller table given in *Public Health Reports*, Washington, 1942, Vol. 57, No. 17, pp. 638–9, No. 18, pp. 682–3) will serve to demonstrate the severity of the outbreak in Europe and North Africa. No doubt the actual position is worse than the figures indicate, and it is clear that the tendency is markedly towards increase.

Cases of Typhus.

	1941	1942 (to the end of March)
Algeria ...	12,827	11,622
Egypt ...	9,324	4,092
Morocco ...	1,471	9,179
Tunisia ...	7,078	6,432
Germany ...	2,158	85 (one week only)
Hungary ...	652	358
Poland ...	3,786	
Rumania ...	1,827	2,068
Spain ...	9,560	2,943

MOROZKIN (p. 440) refers to the indistinct appearance of the rash in some cases of typhus, especially in children. An abortive form of the disease, in which the fever lasts about nine days, has been found in

* The information from which this series of summaries has been compiled is given in the abstracts made by the Sectional Editors in the *Tropical Diseases Bulletin*, 1941, Vol. 38. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

2·1 per cent. of cases. GROMASCHEWSKI and MOROZKIN (p. 441) note that the average febrile period in Russia is 14·4 and 14·9 days for winter and summer respectively. They deny that there is any seasonal difference in the character of the disease. RUGE and SCHILLING (p. 199) discuss the possibility that typhus may occur in the absence of a rash. There is fairly general agreement that, in a small proportion of cases, there may be no rash, or that it may be difficult to detect. [See also DOWDS below.]

BORRA (p. 200) gives a clinical description of typhus as it is seen in Ethiopia. D'IGNAZIO *et al.* (p. 200) have studied the cerebrospinal fluid in typhus. It is under increased pressure, but remains clear except in severe cases, when there may be a high polymorphonuclear content, or blood. SANGIOVANNI (p. 201) and GUERRA (p. 201) give accounts of the changes found in the auditory and the visual apparatus, respectively, in typhus.

CASTAÑEDA *et al.* (p. 448) describe their technique for preparing the antigen of *Proteus OX19* for the agglutination test which, with the aid of methylene blue, can be carried out with whole blood at the bedside. They point out, however, that agglutinins against *R. prowazeki* appear earlier than those against *Proteus OX19* and that agglutination of Rickettsiae can readily be detected by means of the microscope.

LIU *et al.* (p. 681) state that in normal mice *R. prowazeki* gives only inapparent infection which dies out after three passages. If, however, mice are irradiated and then given considerable doses of the Rickettsiae by the abdominal route, all become infected and die, and Rickettsiae are numerous in peritoneal exudate and various organs. Mice may thus be used in experimental work and in preparation of vaccines. [This recalls Zinsser and Castañeda's method of preparing murine vaccine, see this *Bulletin*, 1933, Vol. 30, p. 887; 1939, Vol. 36, p. 1002.]

Flea-borne.—SILVA and OCHOA (p. 682) have isolated a murine strain from rats at Zacoalco, Mexico; they point out that in the high plateaux of Mexico, as in Shanghai, infection of murine origin is spread from man to man by lice.

A form of typhus exists at Pinar del Rio, Cuba, which, according to *Vida Nueva* (p. 203) is probably of murine origin. In support of this view is the fact that CURBELO *et al.* (p. 442) have identified Rickettsiae of the murine type in a rat in Pinar del Rio; they also regard the human disease seen in this area as of the same kind.

MELENEY (p. 681) refers to the recent increase in typhus [of the murine type] in the Southern United States. Larger numbers of cases have been found in the cities in which it was originally discovered, and extension has taken place to other cities, towns and rural areas.

DOWDS (p. 442) reports a number of cases of mild typhus in native labourers on the copper mines in N. Rhodesia. In no case could a rash be detected. [It will be remembered that SCAFFIDI (this *Bulletin*, 1939, Vol. 36, p. 989) pointed out that in black skins the rash of louse-borne typhus shows variations in intensity, and may be no more than a transient macular exanthem.] *Proteus OX19* was usually agglutinated in high titre, and inoculation of blood produced fever and scrotal lesions in guineapigs. There was no history of tick bite, and the evidence points to typhus of murine origin; rats were abundant in the men's huts.

BHATIA (p. 442) reports a case of typhus, probably of murine origin, from Lucknow.

LEIMENA (p. 685) notes that although mite-borne typhus is prevalent in Sumatra, flea-borne typhus of murine origin (shop typhus) is more common in Java.

ASANO (p. 442) reports a number of cases of typhus, presumably of murine origin, in the neighbourhood of Okayama.

HARALSON (p. 441) notes a marked increase of typhus in the Hawaiian islands during 1940.

LIU *et al.* (p. 202) note that the production of orchitis in guineapigs is not a certain criterion for the diagnosis of strains of murine typhus Rickettsiae, since there are murine types, virulent for rats and mice, which do not produce orchitis in guineapigs. In Peiping, strains have been found in man which are non-orchitic but which are virulent to rats; strains from rats, however, usually give orchitis in guineapigs. From a consideration of the whole matter the authors incline to the view that the strains from man which they have tested are all of murine type. It seems probable, however, that louse-borne disease occurs in Peiping, but it is not yet clear whether this form is of murine origin, or is true epidemic typhus.

NAUCK and ZUMPT (p. 443) have confirmed previous work which indicated that *Cimex lectularius* is of no importance in the transmission of murine typhus.

HUDSON (p. 448) describes an agglutination test against emulsions of Rickettsiae from the infected lungs of rats and mice. Clear-cut results were given with sera from patients with typhus [presumably of murine origin] in high dilution. BENGTSON (p. 682) writes of a complement fixation test in which the antigen was a suspension of murine Rickettsiae from infected mouse lung or fowl embryo. Complement fixation was obtained with sera from patients infected from seven days to nine years before, but could not be obtained with sera from cases of Rocky Mountain or Q fever. The reaction appears, therefore, to be specific.

Proteus OXK type. Vector: mite.

While maintaining a distinction in nomenclature between mite fever and tropical scrub typhus, VAN DER SCHROEFF (p. 684) contends that they are, in fact, the same disease in Sumatra. A primary sore may appear in either, and an explanation offered by some observers [who believe that the disease is transmitted by ticks as well as by mites] is that the mite pierces the superficial layers of the skin only, so that the infecting agent causes necrosis of the skin and ulceration, whereas the tick penetrates to the subcutaneous tissue, and no necrosis occurs [that this is not true of all tick-borne typhus infections is shown by the fact that a primary sore is a typical part of the syndrome of boutonneuse fever].

LEIMENA (p. 685) describes a case of scrub (mite-borne) typhus in Bandoeng, Java. This is the second to be described from this district.

GUNTHER (p. 445) has investigated the endemic typhus of New Guinea, which is practically confined to adult males working in bush

country or in newly cleared areas. He has not seen this disease in the natives of the country. It resembles tsutsugamushi, the Weil-Felix reaction is positive to *Proteus OXK*, and the author concludes, on the evidence of a careful survey of mites, that it is transmitted by *Trombicula minor* and that the reservoir is the bandicoot. [The name endemic typhus is misleading; it is commonly applied to typhus of murine origin in other countries. LEWTHWAITE and SAVOOR (this *Bulletin*, 1940, Vol. 37, pp. 576, 847) have shown that tsutsugamushi, scrub typhus of Malaya, and Sumatran mite fever are identical. There can be little doubt that this New Guinea disease falls into the same group.] MAY (p. 685) describes two cases of fever in Europeans in Papua. This was undoubtedly fever of the tsutsugamushi type, with Weil-Felix reaction positive to *Proteus OXK*. It is thought that this disease has probably long existed in the natives.

HEASLIP (p. 445) gives an account of tsutsugamushi in Northern Queensland; the symptoms are those of tsutsugamushi as seen elsewhere, and the Weil-Felix reaction is positive with *Proteus OXK*. Diagnosis may be made by inoculating blood, taken during the fever, into mice; a positive result is indicated by pleural and peritoneal effusion with enlargement of the spleen and death in about 10 days. Natural infection was found in rats and bandicoots of the scrub country and swampy areas. On these animals larvae of *Trombicula deliensis* were found in large numbers, and this mite is probably responsible for transmission, as it is in the East Indies. The same author (p. 451) calls attention to the differentiation of the mite-borne typhus of N. Queensland from the so-called Coastal fever of the same area. Blood from cases of Coastal fever does not give the same result in mice as that from typhus. [As this disease is thought to be due to a Pasteurella-like bacillus, it is not included in the typhus group, but gives trouble in differential diagnosis.]

KOUWENAAR and ESSEVELD (p. 686) in Sumatra note that most strains of mite-borne typhus fail to produce fever in guineapigs. One strain, however, does so, and in work with this strain the authors have reached the following conclusions:—Guineapigs, after this infection, remain immune for at least 13 months; convalescent serum from man or guineapig fails to protect, however employed; serum has only slight effect in attenuation of virus when the two are left in contact before injection.

REYNES (p. 680) reports that sera from patients with mite-borne typhus showed a distinct tendency to become positive to the Kahn test as the disease progressed.

Indeterminate type. Vector: tick.

ALEXANDER, MASON and NEITZ (p. 203) in South Africa have carried out important researches on four strains of tick-borne Rickettsiae (one from a dog, one from *Hyalomma aegyptium*, one from a case of tick-bite fever, and one from *Rhipicephalus sanguineus* sent from Tunis) and have compared these strains with a strain of South African murine Rickettsia. The four strains are classed as Group I, the murine strain as Group II. There was great similarity between the strains of Group I, but strong dissimilarity between Group I and Group II. These characters may be set out, for clarity, in tabular form:—

	Group I	Group II
Smears from exudate of guineapig testis.	Rickettsiae few; scattered in cytoplasm of monocytes and serosal cells.	Rickettsiae in masses and clumps; polymorphic.
Smears from egg cultures.	Rickettsiae relatively few in cells but with numerous intranuclear forms.	Rickettsiae in masses in cytoplasm of cells, never intranuclear.
Infectivity to guineapigs.	Large doses required; not readily passaged; scrotal reaction present if large doses employed.	Infection easily produced; almost constant scrotal reaction.
Infectivity to white rats.	Poor in general.	Rats easily infected.
Weil-Felix, with *Proteus OX19* in rabbits.	Only 1 of 10 positive, in low dilution.	10 of 10 positive.
Cross protection tests.	Protection within the group marked; no protection against Group I.	Protects against itself and also against Group I.

These experiments show that the Rickettsiae of African tick-bite fever and of boutonneuse fever are immunologically related, but are distinct from the Rickettsiae of murine typhus. Group I belongs to the Rocky Mountain fever group; Group II to the typhus fever group.

FINLAYSON *et al.* (p. 205) point out that little is known of the vector of tick-bite fever in South Africa. They have isolated a strain of Rickettsia from a batch of *Hyalomma aegyptium* collected from a cow. This produces scrotal reaction in guineapigs, inapparent infection of rats and mice, fails to produce agglutinins for any strain of Proteus, on injection into rabbits, and does not protect against murine or louse-borne typhus, though animals inoculated with murine or louse-borne strains are protected against this tick-borne strain. They consider that their strain is probably that of tick-bite fever, though there are points of similarity with that of Q fever. [The close correspondence between these findings and those of ALEXANDER *et al.* (above) is strong confirmation of the authors' view that their strain is that of tick-bite fever. It is, however, time that a better name be given to this disease; tick-borne typhus would be preferable.]

CAMPBELL and KETCHUM (p. 206) could not detect any characteristics which would serve to differentiate clinically the Western from the Eastern type of Rocky Mountain fever, in a few cases observed. Furthermore, they state that the fatality rates of the two varieties, calculated from a large series of cases recorded in the literature, were approximately equal, 19·4 per cent. for Western and 18·1 per cent. for Eastern cases. [It will be remembered that great differences in fatality rates have, in the past, been reported from the Western States—82 to 90 per cent. in Montana; about 5 per cent. in Idaho—and that strains

of Rickettsiae isolated from Eastern cases have usually been less virulent for guineapigs than those derived from Montana. Exceptions have occurred, however, and a fully virulent strain was reported from Washington, see this *Bulletin*, 1940, Vol. 37, p. 843.] BRIGHAM and WATT (p. 682) note that, in general, the strains of Rocky Mountain fever Rickettsiae from Montana and the West are more virulent than those found in the Eastern United States, and produce scrotal lesions and high death-rate in guineapigs, after a short incubation period. These criteria have been used to distinguish the two strains. The authors now report, however, that two highly virulent strains have been recovered from dog ticks (*Dermacentor variabilis*) in Georgia, and that the typical scrotal reaction was produced in guineapigs by one of these strains. They describe the scrotal reaction in detail. They recall that a severe case of Rocky Mountain fever, similar to those commonly found in the West, has been described in a patient in the East.

HASSIN (p. 683) describes the cerebral changes in a case of Rocky Mountain fever, which are those of non-suppurative meningo-encephalitis. They are analogous to those found in typhus fever.

MAIL (p. 205) gives an account of measures which may be taken against *Dermacentor andersoni* in North America. This tick, which is associated with the spread of Rocky Mountain fever, is found on livestock and rodents and is the tick which most commonly attacks man.

DE MAGALHÃES and MOREIRA (p. 443) describe a fulminating form of typhus found in Minas Geraes in which there may be no prodromata or rash and which may lead to death so sudden that there may be suspicion of foul play. [No information as to the form of typhus is given, but the usual type in Minas Geraes is tick-borne, the virus being identical with that of Rocky Mountain spotted fever (see this *Bulletin*, 1940, Vol. 37, p. 574).] DE MAGALHÃES (p. 444) describes a case of inapparent infection in Minas Geraes, and notes that in the same house was a dog whose blood was infective to guineapigs, though the dog itself was apparently healthy. With PENNA the same author describes the electro-cardiograph findings in this disease.

DE MAGALHÃES (p. 444) mentions animal reservoirs of the tick-borne typhus of Minas Geraes :—the dog, two species of opossum, the fox, the rabbit-like cotia, and the bush rabbit. He has found that the wild cat *Felis wiedi* can be infected experimentally.

LUDLAM *et al.* (p. 683) describe a case of fever in a docker at a Scottish port who had been unloading hides from South America. The serum was positive to *Proteus OX2* but negative to *OX19* and *OXK* ; the blood did not produce infection in guineapigs. On the whole this appears to have been a case of tick-borne typhus similar to that found in S. Paulo, and it is suggested that infection was acquired from ticks in the hides or infesting the ship's rats.

Vaccination.

LIU and ZIA (p. 207) have used a Weigl vaccine and a tissue culture vaccine in China, with apparently successful results in creating a positive Weil-Felix response, or of increasing an already positive reaction. TCHANG and MATHEWS (p. 450) prepare vaccines from cultures of the Chinese strain of *R. prowazeki* in developing fowl embryos ;

these are standardized to the equivalent of the content of 100 infected louse intestines and have been used in man. In guineapigs, one-tenth of this dose produces solid immunity.

DURAND and GIROUD (p. 686) write of their method of preparing vaccines of *R. prowazeki* by infecting rabbits by the intratracheal route and obtaining suspensions from the lungs. Protection afforded to guineapigs is high, and in man there is a satisfactory production of positive Weil-Felix reaction. CASTAÑEDA (p. 687) shows that vaccine of Rickettsiae of murine origin, prepared from infected rat lung, will protect against epidemic typhus, though only if larger doses than of a comparable epidemic strain are used. It is not yet possible to say if there are antigenic differences between the two strains, but even if there are, they are apparently not great enough to justify disregard of the immunizing power of murine strains against epidemic disease.

FINLAYSON and GROBLER (p. 687) have used in South Africa a vaccine (of epidemic typhus Rickettsiae) prepared by the Zinsser-Castañeda technique from the peritoneal exudate of irradiated infected rats. A single dose does not protect so well as three doses, but alum-treated vaccine will protect 80 per cent. of experimental animals, and it is thought that the use of such a vaccine may help to overcome the difficulty of persuading African natives to return for successive doses.

KUROTCHKIN and WYCKOFF (p. 451) have obtained good protection in tests of Rickettsiae of Rocky Mountain fever and of louse-borne typhus grown on agar (Zinsser's method) or cultivated according to Cox's method in the yolk sac of the fowl embryo. PARKER (p. 688) reviews the results obtained from the use of a killed vaccine against Rocky Mountain fever prepared from the tissues of infected ticks (*D. andersoni*) and employed in Montana and Idaho. This vaccine gives high protection against death, but little against attack, in areas of highly virulent infection such as western Montana. In Idaho, however, where case mortality is low, the vaccine gives almost complete protection against attack. Vaccination in two or more successive years increases protection, and vaccination within a day or two after tick bite may modify the attack in areas where infection is usually mild. The only condition in which vaccination is not recommended is when a bite by a suspected tick has already occurred in areas of highly virulent infection.

SINGER (p. 679) reports attempts to cultivate Rickettsiae in cell-free media. Limited success was obtained.

Q fever.

The epizoology of Q fever is becoming clearer. FREEMAN *et al.* (p. 208) have used the agglutination of *Rickettsia burneti* in a survey of animals in Queensland; agglutinins are present in the serum for several months after an attack, and even in cases where the fever has been inapparent. This test indicates that the bandicoot *Isoodon torosus* is important in the natural spread of the disease; it is heavily infested with the tick *Haemaphysalis humerosa*. Agglutinins have also been found in rats and in one cow. In man there were a number of positive results with sera from abattoir workers in Brisbane, but it is thought that *H. humerosa* does not readily attack man. The *potential* hosts of Q fever in Queensland are numerous. DERRICK *et al.* (p. 447) have

found seven rodents and two marsupials to be susceptible to experimental inoculation of the Rickettsia, though the infections produced were all either mild or inapparent. The names of the animals are given in the abstract.

DAVIS (p. 689) has shown that the Rickettsia of American Q fever (*R. diaporica*) is not transmitted to guineapigs by *Ornithodorus turicata* during the act of feeding. The faeces of the infected ticks are infective, however, and the tissues of the ticks may remain infective for 1,001 days after the infective feed. The virulence of *R. diaporica* is not affected by long residence in the tick or by prolonged fasting of the tick. The infection is not transmitted hereditarily in the tick. SMITH (p. 690) has found *Rhipicephalus sanguineus* to be a potential vector of Q fever in Queensland. The tissues and faeces are infective but the infection is not transmitted hereditarily.

BENGTSON (p. 446) notes that the evidence obtained from serological and cross-immunity tests indicates that the Rickettsiae of the American (X) and the Australian (Q) strains are identical. The American strain is apparently slightly more virulent, but this difference is no greater than that found between the strains of Rocky Mountain fever Rickettsiae. BURNET and FREEMAN (p. 688) in Australia have confirmed the finding that the American and Australian strains of the Rickettsia of Q fever are immunologically identical, though the American strain with which they worked was considerably more virulent than the Australian strain for guineapigs. They note that Rickettsiae, killed or inactivated by formalin or heat, produce, on injection, substantial immunity in guineapigs.

BURNET and FREEMAN (p. 689) have infected egg membranes with *R. burneti* and note that the changes produced are similar to those which occur in virus infections. The virulence of the infection for guineapigs is much increased after culture in egg membrane, as is the virulence of the Rocky Mountain fever Rickettsia in the tick; the explanation suggested for these increases in virulence is that in neither case are antibodies produced, whereas in infected animals antibodies are found.

HORNIBROOK *et al.* (p. 691) describe an outbreak of Q fever in the National Institute of Health, Washington, where strains of the Rickettsia were being studied. It is not clear how the outbreak originated, but it is thought that the infection may have been dust-borne. Clinically, the characteristic feature was patchy pneumonitis, detected by X-ray, but giving rise to few physical signs. LILLIE *et al.* (p. 446) give an account of the pathological changes seen in human pneumonitis in Q fever, and note that these are essentially the same as those which occur in monkeys infected by the intrapulmonary route. Rickettsiae, however, were not seen either in the human or animal material. Similar patchy pneumonitis was found in a patient who contracted the disease naturally in Montana. There was no evidence of tick bite, but there was a rising titre of agglutinins for *R. diaporica*; HESDORFFER and DUFFALO (p. 691) consider that the disease is probably more widespread than is at present known.

BENGTSON (p. 690) reports that a complement fixation test for Q fever, in which the antigen is obtained from yolk sac cultures, is a valuable diagnostic measure. She (p. 690) notes that in Q fever the processes of active and passive immunity follow the same general laws as those which apply in bacterial infections. Active immunity can be

induced by the injection of killed Rickettsiae and hyper-immune serum can be prepared by this procedure followed by the injection of living organisms. *Charles Wilcocks.*

MALARIA.

SIVALINGHAM (V.) & RUSTOMJEE (K. J.). **Spleen and Parasite Surveys in Ceylon.**—*Jl. Malaria Inst. of India.* 1941. Dec. Vol. 4. No. 2. pp. 155–173. With 7 maps. [19 refs.]

The spleen and parasite surveys reported were carried out in February and March 1938 and 1939. Schoolboys aged 5 to 14 were the subject of the surveys, 144,873 in 1938 and 148,504 in 1939. Blood films from 10 per cent. of the boys were examined ; from 33 per cent. in some areas with scanty populations in 1939.

Ceylon may be divided into three zones according to the rainfall during the period of the south-west monsoon. The dry zone with less than 20 inches of rain comprises the northern and eastern halves of the island. The wet zone is the south-west corner of the island ; here the south-west monsoon rainfall exceeds 40 inches. The intermediate zone, a narrow arc-shaped strip, plentifully provided with mountains and rivers, separates the wet from the dry zone ; its monsoon rainfall varies from 20 to 40 inches. Nearly all the hyperendemic malaria areas of Ceylon are in the dry zone. There is least endemic malaria in the wet zone. Spleen rates in the intermediate zone are subject to the greatest fluctuations. Spleen rates may be high in the intermediate and wet zones immediately after an epidemic of malaria ; thereafter they diminish progressively, usually for four or five years, at which intervals epidemics are apt to recur. Most of the dry zone had spleen rates of from 40 to 60 per cent. ; most of the wet zone of from 0 to 10 per cent.

In 1939, films examined in the dry zone numbered 9,765 ; parasites were found in 698, *P. malariae* 55 per cent., *P. falciparum* 26 per cent., *P. vivax* 19 per cent. In the intermediate zone 5,955 films were examined ; parasites found in 295, *P. malariae* 52 per cent., *P. falciparum* 29 per cent., *P. vivax* 19 per cent. In the wet zone parasites were found in 118 out of 5,970 films, *P. malariae* 30 per cent., *P. falciparum* 33 per cent., *P. vivax* 37 per cent. *Norman White.*

HÜHNE (Wolfgang). Die Malaria in Westafrika. [**Malaria in West Africa.**]—*Deut. Trop. Ztschr.* 1942. Jan. 1 & 15. Vol. 46. Nos. 1 & 2. pp. 3–18 ; 33–48. [39 refs.]

These papers contain brief notes on malaria in Mauretania, Senegambia, Portuguese Guinea, French Guinea, Sierra Leone, Liberia, Ivory Coast, Gold Coast, Togo, Dahomey, Nigeria, the Cameroons, Gabon, and the Belgian Congo. No new work is reported. The common vectors, the common parasites, and the geographical distribution of infection are briefly mentioned. *C. W.*

ROZEBOOM (L. E.) & LAIRD (R. L.). *Anopheles (kerteszia) bellator* **Dyar and Knab as a Vector of Malaria in Trinidad, British West Indies.**—*Amer. Jl. Trop. Med.* 1942. Jan. Vol. 22. No. 1. pp. 83–91.

In 1930 a malaria survey of Trinidad disclosed the fact that the two important vectors of malaria in the Island are *A. bellator* and *A. tarsimaculatus* [DE VERTEUIL and SPENCE, this *Bulletin*, 1937, Vol. 34, p. 582]. The present paper affords additional evidence that *A. bellator* is a dangerous vector, the control of which will be costly. Its control is a matter of importance to United States military forces. Observations were mainly restricted to two small communities in a highly malarious cocoa-growing district.

Four species of Anopheles were found: *A. bellator*, *A. oswaldoi*, *A. mediopunctatus* and *A. nimbus*. Of 5,754 adult anophelines captured 5,495 were *A. bellator*. *A. bellator* breeds exclusively in collections of water at the base of leaves of bromeliads which extensively parasitize immortelle trees, which abound as shade trees on cocoa estates. Four species of Bromeliaceae capable of holding water are abundant: they are species of *Tillandsia*, *Aechmea*, *Gravisia*, and *Wittmackia*. Larvae of *A. bellator* were found in only two, *Gravisia* and *Wittmackia*. *Gravisia* is by far the more important. Two dozen larvae or more are often found in the water in a single plant. A total of 409 larvae and pupae were collected from 120 *Gravisia*.

In jungle shade female *A. bellator* will attack early in the afternoon, but the real flight begins at about 5.30 p.m. and continues some two hours, during which very large numbers can be trapped. It prefers human to animal blood. Activity is much less pronounced in the early morning than in the evening. It attacks man viciously out of doors and indoors, preferably the former. It will enter houses in search of human blood; after feeding, the females return immediately to their jungle resting places.

Experimental infections of *A. bellator* were obtained on two occasions; three of 725 wild *A. bellator* were found to be naturally infected. *Norman White.*

ENGINEERING NEWS-RECORD. 1941. Sept. 11. Vol. 127. p. 340.—**New Malaria Mosquito found at Trinidad Base.** [Summary taken from *Public Health Engineering Abstr.*, Washington. 1941. Dec. Vol. 21. No. 12. p. 16. Signed W. A. REIMAN.]

U.S. Army Medical Officers have discovered that the mosquito, *Anopheles bellator*, can transmit malaria. This mosquito breeds in air plants which grow in the top of trees that provide the necessary shade for the production of cocoa. Among the methods of control being considered is the removal of the air plants, which hold rainwater necessary for breeding, from the trees, or cutting down the trees. This latter method might endanger the production of cocoa. [See ROZEBOOM and LAIRD above.]

SEN (P.). **On the Microsporidia Infesting Some Anophelines of India.**—*Jl. Malaria Inst. of India.* 1941. Dec. Vol. 4. No. 2. pp. 257–261. With 19 figs. on 1 plate.

An examination of anopheline larvae in the neighbourhood of Calcutta has shown that those of at least six species are liable to

microsporidial infection. Three species of microsporidia—*Thelohania legeri*, *T. indica* and *T. anomala* n. sp. were concerned in the infections.

C. M. Wenyon.

KOPP (Israel) & SOLOMON (Harry C.). **The Relationship of Hypoalbuminemia to the Edema of Malaria.**—*Amer. Jl. Med. Sci.* 1941. Dec. Vol. 202. No. 6. pp. 861–868. With 2 charts. [16 refs.]

Oedema is of frequent occurrence in patients undergoing therapeutic malaria. It is commonly regarded as of cardiac origin; this the authors consider unlikely. A reduction in the plasma proteins, especially albumen, might account for it; this would change the osmotic pressure and affect the interchange of fluid between blood and tissues. To test this hypothesis, observations were carried out on seven patients undergoing malaria therapy for general paralysis; they had no other complicating diseases. These patients each had from 10 to 13 paroxysms of malaria; the malaria was terminated by the administration of quinine. Three of the patients developed clinical oedema. The observations led to the following conclusions:—

"1. Marked disturbances with a reduction of the plasma proteins occur in malarial fever. Albumin values fall progressively to critical levels at which edema may occur. Globulin, as a rule, shows a progressive increase after the first few paroxysms, reaching its highest level at a time when albumin values are about lowest. Fibrinogen values fluctuate considerably and in 3 of 7 patients were reduced below pre-febrile levels.

"2. The termination of malarial fever is followed by an immediate and continued rise of albumin and a delayed but progressive drop of globulin from its highest level so that normal values are obtained in from 10 to 24 days. Fibrinogen values return to normal within 1 week's time.

"3. The albumin-globulin ratio falls rapidly during malaria reaching levels of 1 or below after 10 to 12 paroxysms have occurred.

"4. The dependent or generalized edema occurring during the course of therapeutic malaria in patients free from renal damage or cardiac failure, is the result of a reduced osmotic pressure caused by a marked fall of the albumin fraction to levels of 3 gm. per 100 cc. or below."

Norman White.

BURNEY (L. E.), MAYS (J. R. S.) & ISKRANT (A. P.). **Results of Serologic Tests for Syphilis in Non-Syphilitic Persons Inoculated with Malaria.**—*Amer. Jl. Public Health.* 1942. Jan. Vol. 32. No. 1. pp. 39–47. With 1 chart. [12 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The question whether or not malaria has any effect on serum reactions for syphilis is important for many reasons, particularly because of the serological surveys of populations of malarious districts to discover the prevalence of syphilis amongst them. The authors of the present paper quote a number of opposing opinions on this subject and criticize previous work on the grounds of most having been carried out on patients in whom syphilis could not be entirely ruled out. Also, many of the opinions to the effect that malaria does not cause the Wassermann reaction to become positive in the absence of syphilis are based on tests at a time when methods were not so sensitive as at present.

KITCHEN *et al.* [*Bull. of Hyg.*, 1939, Vol. 14, p. 619] made a systematic study in non-syphilitic patients inoculated with malaria for psychoses,

using as controls similar patients not so inoculated. In every case the malaria produced syphilitic serum reactions. The present authors have studied 11 similar patients inoculated with malaria (3 by blood and 8 by mosquito bite) and had serial tests of their blood carried out by HINTON, KAHN, KLINE and KOLMER, each of these using the method or methods associated with his name; in addition the same specimens were tested by MAHONEY using the Kahn, Kline and Kolmer methods. The tests were carried out weekly during the incubation period, every 4 days during the febrile period (10 paroxysms) and then weekly until the reactions had again become negative. Prior to the inoculation none of the 11 gave a positive reaction and only two workers, Hinton and Mahoney, reported other than negative reactions with them, the first getting a doubtful reaction with his test and the second a doubtful with the Kolmer-Wassermann test. In the subsequent assessment the Hinton and the Kolmer (Mahoney operated) tests of the sera from these two cases were not counted.

During or after the febrile period all the sera gave at least one positive reaction to the Kahn Standard and Kline Diagnostic tests. The Eagle Wassermann gave positive reactions with 5, doubtful with 1 and negative with 5; the Eagle micro-flocculation test gave positive with 4, doubtful with and negative with 6; the Hinton gave doubtful with 3 and negative with 7; the Kolmer in Kolmer's hands gave positive with 7 and negative with 4; and the Kolmer in Mahoney's hands gave positive with 9 and doubtful with 1. With one exception no case was positive before the outbreak of the fever; in the exceptional case the first positive reaction occurred in blood taken on the day before the first paroxysm. The occurrence of the positive reactions was in no case fortuitous; after a patient had given a positive reaction he gave one or more afterwards, and a negative reaction was never sandwiched between two positive ones. The highest percentage of positive reactions occurred 15 to 21 days after the start of the febrile period, *i.e.* in the last week before the malaria was ended by administration of quinine. With the exception of one case all were negative again 4 weeks after termination of the fever. Thus the investigation supports the findings of KITCHEN *et al.* and indicates that in serological surveys to determine the prevalence of syphilis in a population regard must be paid to the possibility that positive reactions may be due to recent attacks of malaria. *L. W. Harrison.*

BRYANT (J.). **Heavy Atebrin Dosage in the Treatment of Malaria.**—*East African Med. Jl.* 1942. Jan. Vol. 18. No. 10. pp. 295–301.

The author writes with long experience of malaria in the Bahr el Ghazal Province of the Sudan, where *P. falciparum* infections are often characterized by very high temperature, frequent vomiting and prostration, and great difficulty in finding parasites in the peripheral blood in very severe attacks of fever. Moreover, blackwater fever was frequently observed after an injection of quinine or after large doses of quinine had been given by mouth. He found that atebrin in doses of 0·3 gm. a day did not control severe malaria; that atebrin combined with plasmoquine produced nausea and colic or vomiting, and that atebrin combined with quinine made the recipient feel exceedingly ill. Such experience led him to administer atebrin in much larger doses than those usually recommended. He found that 0·6 or even 0·9 gm.

a day produce no ill effects if plenty of hot, very sweet, tea, or sugar in some other form, is taken. It is believed that the parasiticidal action of atebrin is not marked till the renal threshold of the drug has been reached; when the urine becomes bright yellow the temperature falls and improvement in the patient's condition is immediate.

In the treatment of a severe case 0·3 gm. of atebrin musonate is given intramuscularly and 0·3 gm. atebrin by mouth on the first day; if the tablets are vomited the injection is repeated after 3 hours. In serious cases a third dose of 0·3 gm. may be given, 0·9 gm. in all on the first day. On the second day 0·6 gm. is given in two doses; if nausea persists an injection of atebrin musonate replaces the first dose. Thus, during the first two days from 1·2 to 1·5 gm. of atebrin are given. Thereafter three tablets (each of 0·1 gm.) a day, in one dose after breakfast, are taken until 24 tablets in all have been administered. Many people cannot tolerate more than twenty tablets. This course of atebrin is followed after an interval of four days by quinine, 15 grains a day for four days. After another four-day interval two tablets of plasmoquine simplex (each of 0·01 gm.) three times a day for three to four days, if tolerated, complete the specific treatment.

A constant bitter taste in the mouth and some depression were the only toxic symptoms produced by these large doses of atebrin. Nausea indicates the necessity for terminating treatment or reducing the dose of atebrin towards the end of the course. Plenty of sugar prevents toxic symptoms.

Splenomegaly and relapse are uncommon after this treatment.

Self-treatment by laymen in remote stations is encouraged; for this purpose a sheet of instructions is issued. *Norman White.*

RUSSELL (Paul F.) & KNIPE (Fred W.). **Malaria Control by Spray-Killing Adult Mosquitoes. Third Season's Results.**—*Jl. Malaria Inst. of India.* 1941. Dec. Vol. 4. No. 2. pp. 181–197. With 4 figs.

Two previous papers on malaria control by spray-killing adult mosquitoes in South Indian villages have been published by the authors [see this *Bulletin*, 1940, Vol. 37, p. 504; 1941, Vol. 38, p. 645]. This paper records the results obtained by a continuation and extension of the work previously reported. Efforts were made to find the most satisfactory type of spray apparatus. Hand-pumped air tanks and power-filled air tanks were used. In both cases the tanks were fitted with pressure-reducing regulators to insure a constant pressure on the spray-gun nozzle. The best method of generating gas pressure is by the use of solidified carbon dioxide [this *Bulletin*, 1942, Vol. 39, p. 181] but its high cost in India makes it impracticable. For power-filled air tanks a small portable compressor driven by a petrol engine was used; the tank, carried on the labourer's back, was fitted with an automobile tyre valve and the operation of charging was similar to the inflation of a motor tyre at a service station. The ordinary "flit gun" type of sprayer is not substantial enough for extensive use and is wasteful of insecticide. Efforts are being made to design a cheap and simple apparatus that will withstand hard usage and give a well vaporized spray.

In addition to Kasangdu, the village in which spraying operations have been carried out for three years, three other villages were sprayed

in 1940. In one a locally made extract of Indian pyrethrum flowers was used instead of Pyrocide 20; it was found to be as effective and was little more than half the cost of Pyrocide 20.

The effect of spraying on malaria incidence was satisfactory. Spleen rates in Kasangdu have fallen from 68 in the malaria season of 1937 to 6 in 1940; parasite rates from 57 to zero. No infant was found infected in 1940. Downward trends in spleen and parasite indices were noted in the other villages. In a control village spleen and parasite rates have become a little higher.

The cost of spraying has been reduced to 5 annas per head of population per annum. The villagers like the method. Local free labour would still further reduce the cost. The measure is ever-recurring but it is effective. *Norman White.*

JOB (T. J.). **On the Comparative Efficacy and Relative Costs of Biological and Chemical Methods of Mosquito Control in Clean-Weeded Railway Borrowpits at Fuleshwar, Bengal.**—*Jl. Malaria Inst. of India.* 1941. Dec. Vol. 4. No. 2. pp. 211–215.

Bunds were erected dividing a borrowpit into three equal sections each 20 feet by 12 feet. The margin was clean and the bottom muddy. One section was treated with Paris green on every fifth day. Into the second section 96 adult and 48 young *Aplocheilus panchax* were introduced. The third section was an untreated control. The fish destroyed all aquatic stages of both anopheline and culicine mosquitoes. Paris green destroyed the late instar larvae of anophelines only. The cost of introducing and replenishing supplies of fish was only a tenth of the cost of applying Paris green. *Norman White.*

CORRADETTI (Augusto). Die biologische Bedeutung des endohistiozytären Zyklus des *Plasmodium gallinaceum.* [**Biological Significance of Exoerythrocytic Cycle of** *P. gallinaceum.*]—*Zent. f. Bakt.* I. Abt. Orig. 1942. Feb. 16. Vol. 148. No. 6. pp. 274–279. [33 refs.]

The presence or absence of exo-erythrocytic schizonts in fowls inoculated with *Plasmodium gallinaceum* depends on the degree of balance between the host and the parasite. When sporozoites are injected into fowls exo-erythrocytic schizonts are demonstrable in the organs before the erythrocytic forms appear. Thirty days after the inoculation they are no longer present. When an emulsion of an organ containing exo-erythrocytic forms is injected the course of events is similar to that following injection of sporozoites. A different result follows injection of blood from a fowl, the inner organs of which contain no exo-erythrocytic forms. After an incubation period of eight to ten days erythrocytic forms appear in the blood; these increase for about 11 days, after which one of two courses may be followed. Either the infection decreases in intensity from day to day, indicative of a developing balance between host and parasite, or no such decrease occurs. In the former case the blood infection persists for some months and there is no development of exo-erythrocytic schizonts, while in the latter there follows a flooding of the reticulo-endothelial system with parasites which later give rise to exo-erythrocytic schizonts. When blood from a fowl whose inner organs contain exo-erythrocytic schizonts is injected into a healthy fowl, either exo-erythrocytic

schizonts are found to be present when the erythrocytic forms first appear, or else they appear later. It seems, therefore, that when sporozoites or exo-erythrocytic forms are injected into fowls, invasion of the reticulo-endothelial cells occurs with the development of exo-erythrocytic schizonts because there is as yet no immunity. In support of this conclusion the author states that he has shown that the injection of sporozoites or exo-erythrocytic schizonts into fowls which have passed into the latent phase of an infection and have developed some degree of immunity is not followed by the development of exo-erythrocytic schizonts. In all cases, as the immunity develops, the exo-erythrocytic cycle ceases. The exo-erythrocytic forms are not developed solely from sporozoites. They arise from merozoites which have been produced by exo-erythrocytic as well as erythrocytic schizonts. The absence of these forms from fowls with a developed immunity shows that the resistance of infections to drugs and the tendency to relapses cannot be explained by assuming that the exo-erythrocytic forms are responsible, for they are no longer present. Relapses are due to the persistent erythrocytic forms which have taken on a renewed activity. Parasites such as *P. gallinaceum* are thus able to infect cells of the reticulo-endothelial system as well as red blood corpuscles, but the former only so long as no immunity or balance between host and parasite exists. *C. M. Wenyon.*

ZAIN (H.). Verhalten der aus erythrocytären Parasitenformen hervorgegangenen E-Stadien des *Plasmodium gallinaceum.* [**Behaviour of Exoerythrocytic Stages of** *P. gallinaceum* **Developed from Erythrocytic Forms.**]—*Arch. f. Experim. Path. u. Pharm.* 1941. Dec. 8. Vol. 198. No. 4/5. pp. 551–556. With 2 figs.

If fowls are infected with *Plasmodium gallinaceum* by injection of sporozoites the first forms to develop are the exo-erythrocytic schizonts. The merozoites from these can give rise to further exo-erythrocytic schizonts or to the erythrocytic pigmented parasites. The exo-erythrocytic schizonts are readily demonstrable in the brain at the time of the commencement of the acute malarial infection. If blood containing erythrocytic forms only is inoculated intramuscularly the first forms to develop are erythrocytic forms, and it is only about two weeks after the first appearance in the blood of these pigmented parasites that exo-erythrocytic schizonts are to be found in the brain. The injection of sporozoites thus leads to the early appearance in the brain of exo-erythrocytic schizonts, while injection of pigmented parasites leads to their late appearance. In the latter case it is evident that the exo-erythrocytic schizonts have developed from the erythrocytic forms. In an earlier paper [this *Bulletin*, 1942, Vol. 39, p. 26] it was shown that injection of those exo-erythrocytic schizonts which had developed from sporozoites and had appeared early again led to the early appearance of such forms in the inoculated fowls. The question arose as to whether the injection of exo-erythrocytic schizonts which had developed from erythrocytic forms and had appeared late would also be followed by the early development of exo-erythrocytic forms. The present paper describes experiments designed to test this point. The result was that the injection of such forms is followed by the early appearance of the schizonts in the brain just as it is after the injection of sporozoites or the early-appearing exo-erythrocytic forms developed from them.

C. M. Wenyon.

BELTRAN (Enrique) & VARGAS (Luis). Intentos de infección de pollos con esporozoites de *Plasmodium gallinaceum* por via oral. [(**Failure of**) **Attempts to Infect Fowls with** *P. gallinaceum* **by the Mouth.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1941. Dec. Vol. 2. No. 3–4. pp. 347–351. English summary (8 lines).

"Negative results are reported in attempts to infect chickens with sporozoites of *P. gallinaceum* by oral route. Salivary glands of *A. aegypti* heavily parasitised, were used suspended in Locke solution; doses given were from one to eight pairs of glands. Six three months old chickens, four four months old chickens and six seven days old chickens were employed. Two of those animals were inoculated, respectively, with sporozoites intramuscularly and intravenously; both developed typical infections with high parasite counts."

SHORTT (H. E.), MENON (K. P.) & SEETHARAMA IYER (P. V.). **The Natural Host of** *Plasmodium gallinaceum* **(Brumpt, 1935).**—*Jl. Malaria Inst. of India.* 1941. Dec. Vol. 4. No. 2. pp. 175–178.

Owing to the fact that wherever *Plasmodium gallinaceum* has been discovered in domestic fowls the wild jungle fowl is found in the adjacent forest, the authors were led to examine the jungle fowl for a *P. gallinaceum* infection. In only one of 40 birds examined was a malarial parasite found, and this was successfully passed to the domestic fowl. Morphologically the parasite from the jungle fowl does not differ in any way from *P. gallinaceum*, while cross immunity tests support the identity of the two parasites. The conclusion is reached that the original host of *P. gallinaceum* is probably the jungle fowl, the exact species of which varies with the locality. *C. M. Wenyon.*

BLACKWATER FEVER.

HOLM (B.). **Successful Use of Sulfanilamide in Treatment of Blackwater Fever.**—*Michigan State Med. Soc. Jl.* 1941. Dec. Vol. 40. p. 988. [Summary taken from *Jl. Amer. Med. Assoc.* 1942. Mar. 14. Vol. 118. No. 11. p. 924.]

Holm encountered a case of blackwater fever in northern Michigan and successfully treated the patient with sulfanilamide. No reports of the previous use of sulfanilamide for blackwater fever are to be found. The interesting features of the case were an unusually high fever (the axillary temperature being 108·4°F.), extreme anaemia, the dramatic response to sulfanilamide of a patient who was moribund and who had previously failed to respond to any form of treatment and the removal of blood pigment stones from the gallbladder. The stones probably resulted from a concentration of blood pigments because of the hemolytic anemia rather than from an infection of the gallbladder.

TRYPANOSOMIASIS.

WOOD (Sherwin F.). **Reactions of Man to the Feeding of Reduviid Bugs.**—*Jl. Parasitology*. 1942. Feb. Vol. 28. No. 1. pp. 43–49.

Reactions have been recorded to the bites of these bugs, which vary from slight local redness to severe illness lasting several weeks. The author placed specimens within reach of his own hand or arm on many occasions, but during feeding there was no marked physical discomfort, nor were there any after-effects, when *Triatoma protracta*, *T. p. woodi*, *T. longipes*, *T. heidemanni*, *T. gerstaeckeri*, *T. sanguisuga* and *T. rubida* were used. With *Paratriatoma hirsuta* local irritation at the site of the bite, with itching and swelling, appeared 40 hours after the feed. None of the bugs was infected with *Trypanosoma cruzi*, though all are potential vectors. The experiments were undertaken to draw a distinction between the effects due to non-infected and infected bugs, since a prevalent symptom of infection is palpebral oedema. *C. W.*

MAZZOTTI (Luis) & LEON (Luis A.). Infección experimental por *Trypanosoma cruzi* de *Triatoma carrioni* del Ecuador. [**Experimental Infection of** *Triatoma carrioni* **with** *Trypanosoma cruzi*.]—Reprinted from *Medicina*. Mexico. 1942. May 10. Vol. 22. No. 411. pp. 191–193. With 1 fig.

Triatomi carrioni was described by Larrousse in 1926 from specimens caught in Loja, Ecuador. The authors have examined 19 specimens but did not find any harbouring *T. cruzi*. They tried to keep them alive for experimental work, but most of them refused to feed and died. Two larvae, however, were fed for 2 months and remained healthy. Then on 5th January, 1942, one was fed on a rat which had been previously infected with *T. cruzi* and had the trypanosome in its blood. On February 9th, that is five weeks later, evolution forms of *T. cruzi* were seen in the dejecta of the larva.

The inhabitants state that this Triatoma flies in from the fields at night, attracted by the lights in dwellings. Though the adult insect lives outside it seems to prefer to enter the houses to lay its ova, for larvae are found in the houses. In the province of Azuay patients are seen with palpebral odema, chronic and acute, and medical men "believe that American trypanosomiasis exists there" [the difficulty of proving this should not be great] and in view of the above experiment it is quite likely that this Triatoma is the transmitter. More investigation is to be undertaken to clear up the doubt.

H. Harold Scott.

MAZZA (Salvador), FREIRE (Ramon S.) & SALICA (Pedro N.). Investigaciones sobre enfermedad de Chagas. Formas meningoencefálicas primitivas y secundarias de enfermedad de Chagas. Considerable gravedad del proceso y tratamiento adecuado con 7602 (Ac) "Bayer." [**Meningo-encephalitis in Chagas's Disease.**]—*Universidad Buenos Aires: Misión de Estudios de Patologia Regional Argentina (Jujuy). Publicación No. 60.* 1942. 35 pp. With 18 figs. [13 refs.]

Meningo-encephalitis may appear as an early (primary) or later (secondary) manifestation of Chagas's disease. Treatment by Bayer 7602 in the doses recommended by Mazza brings about a cure in a

considerable proportion of cases, but the complication is a serious one. Of 29 cases known and described death occurred in 11. This form of the disease is characterized by crises of convulsions, which may be limited to certain parts, arms or legs, or may be general, attacks coming on every 5–20 minutes in severe cases. In the intervals the patient (those recorded were children in the first year of life) usually sleeps. Details of five patients are recorded: an infant of 3½ months, two of 4 months—these three recovered—and two others of 3 months who died. Photographs show the infants in convulsions and in the calm state between the attacks, and photomicrographs show clearly and well the histological changes: leucocytic aggregations, proliferated glia cells and leishmania forms of the parasite.

The site of inoculation is often not found in these cases—Romaña's sign may be absent—and it is thought that infection may take place either by the mother's milk or that, in some cases, it may be transmitted congenitally.

The treatment, the only treatment proving effectual, is that by Bayer 7602, injected intramuscularly in doses of 100 mgm. per kilo, and persevered with. The two infants who died had received less than one-third of this dose, and they died on the 13th day of illness.

H. Harold Scott.

RUCHELLI (Alberto P.). Inexistencia de "Signo de Romaña" en chagásicos descriptos de Tinogasta (Catamarca). [**Chagas's Disease without Romaña's Sign.**]—*Prensa Méd. Argentina.* 1942. Feb. 4. Vol. 29. No. 5. 15 pp. With 1 fig. [11 refs.]

TORRES (C. Magarinos). Alterações dos capilares do coração, na infecção experimental pelo *Schizotrypanum cruzi.* [**Changes in the Cardiac Capillaries in an Animal Infected Experimentally with** *T. cruzi.*]—*Anais Acad. Brasileira de Ciencias.* Rio de Janeiro. 1942. Mar. 31. Vol. 14. No. 1. pp. 1–5. With 8 figs. on 4 plates. English summary.

A puppy, one month old, was inoculated with *T. cruzi*, and killed after 13 days and its heart examined histologically. Only a few of the muscle fibres showed aggregation of the parasite and in most of the sections examined the interstitial tissue appeared normal. Others, however, showed signs of acute diffuse interstitial myocarditis characteristic of Chagas's disease. Cellular infiltration round the capillaries of the myocardium was present, but not in the tissue between the muscular fibres containing the agglomerations of the trypanosome. The inflammatory exudate consisted mainly of macrocytes (like the large mononuclears of the blood) with occasional lymphocytes and plasma cells. The endothelium was swollen and the lumen dilated in the early stages; later, the perivascular infiltration was more intense, the blood content lessened and the lumen small, in fact the walls might be collapsed. The cellular infiltration is held to be due directly to the damage of the myocardial capillaries and not associated with the presence of the trypanosome in the focus itself. The article is illustrated with good photomicrographs. *H. Harold Scott.*

LEISHMANIASIS.

GELDRICH (J.). **First Case of Kala-Azar in Hungary.**—*Monatasschr. f. Kinderheilk.* 1941. Feb. 5. Vol. 85. p. 332. [Summary taken from *Jl. Amer. Med. Assoc.* 1942. May 23. Vol. 119. No. 4. p. 379.]

According to Geldrich, the infantile form of kala-azar or Leishmania infantum occurs in the Mediterranean countries but is practically confined to the coastal regions. In Hungary it has as yet not been observed, although the disease was watched for by pediatricians and internists, particularly during the years after 1920, when numerous cases were reported in Italy. The case reported is the first encountered in Hungary. The splenomegaly, hepatomegaly, intermittent fever and the characteristic blood changes led to the diagnosis of kala-azar, and the demonstration of Leishmania donovani in the splenic punctate corroborated it. Intravenous injections of neostibosan (a pentavalent antimony compound) were given, beginning with 0·03 Gm. and increasing to 0·07 Gm., 0·1 Gm. and finally to 0·2 Gm. The injections were given every second or third day. In all the child received 1·2 Gm. of neostibosan. The effects of the treatment became apparent after the fifth injection, when the fever subsided. A follow-up examination after seven months disclosed that the splenomegaly and hepatomegaly had completely disappeared and that the child can be considered cured.

PESSOA (S. B.). Dados sobre a epidemiologia da leishmaniose tegumentar em S. Paulo. [**Epidemiology of Cutaneous Leishmaniasis in S. Paulo.**]—*Arquivos de Hig. e Saude Pública.* 1941. Jan. Vol. 6. No. 11. pp. 103–121. With 4 graphs & 1 fig. [20 refs.] English summary.

A study of 256 cases of tegumentary leishmaniasis in S. Paulo has revealed a number of points of epidemiological interest.

In areas of high endemicity the majority of cases occur in individuals who give a history of six to twelve months' residence. The incidence falls off with longer residence and some people remain uninfected for several years. Cases occur most commonly in the autumn, but new cases may occur all the year round. The prevalence of the disease bears a definite relationship to the density of the sandfly population, to the predilection of these to attack human beings and to the atmospheric temperature and humidity.

As regards cure, this may occur spontaneously in 7 per cent. of the cases. Of cases which have had cutaneous lesions for a year or more as many as eighty per cent. reveal some involvement of the nasal mucosa. Both infants and adults are liable to infection, the disease tending to be more severe in the former. The Montenegro skin test is generally more strongly positive in negroes than in whites.

C. M. Wenyon.

PESSOA (Samuel B.) & PESTANA (Bruno R.). A intradermo-reação de Montenegro nas campanhas sanitárias contra a leishmaniose. [**Montenegro Skin Test in Leishmaniasis.**]—*Arquivos de Hig. e Saude Pública.* 1941. Jan. Vol. 6. No. 11. pp. 125–137. With 4 figs. English summary.

The authors describe their experience of the Montenegro skin test carried out on 3,000 occasions during the course of a campaign against

muco-cutaneous leishmaniasis in Brazil. The test is performed by injecting intradermally an antigen prepared from the cultural forms of *Leishmania brasiliensis*. In a positive case there develops during the course of 48 hours a specific papule which persists for 4 or 5 days. The reaction is a group one, for like results are obtained with antigens prepared from cultures of other species of *Leishmania* as well as from cultures of *Trypanosoma cruzi*. As with other similar biological tests certain cases of known infection may fail to give a positive reaction, while a positive reaction may sometimes be obtained in other infections. On this account the test should always be controlled by careful clinical observation. In spite of its limitations, in the carrying out of a sanitary survey the test is the best method available for the detection of leishmania infections. *C. M. Wenyon.*

PESSOA (S. B.) & PESTANA (B. R.). Ensaio sobre a vacinação preventiva na leishmaniose tegumentar americana, com germes mortos. [**Attempt at Preventive Vaccination with Killed Organisms in American Cutaneous Leishmaniasis.**]—*Arquivos de Hig. e Saude Pública.* 1941. Jan. Vol. 6. No. 11. pp. 141–147. [12 refs.] English summary.

In Alta Paulista in Brazil, where muco-cutaneous leishmaniasis is endemic, the authors have attempted the immunization of susceptible individuals with a vaccine prepared from cultures of leishmania. In one district 263 persons received subcutaneous injections of the vaccine, while 600 were observed as controls. During the course of the following four months 50 of the controls acquired the disease while only three of the vaccinated individuals did so. These figures give an infection rate of 1 per cent. in the vaccinated as against 8 per cent. in the unvaccinated. The authors consider that these figures are sufficiently encouraging to justify a continuance of the method, perhaps with a modified and improved vaccine. *C. M. Wenyon.*

FEVERS OF THE TYPHUS GROUP.

FITZPATRICK (Florence) & HAMPIL (Bettylee). **Immunological Reactions in Rickettsial Diseases with Special Reference to the Time of Appearance of Antibodies.**—*Amer. Jl. Public Health.* 1941. Dec. Vol. 31. No. 12. pp. 1301–1305. With 2 charts.

In 1921 EPSTEIN reported that the convalescent sera of typhus patients agglutinated antigen prepared from infected lice. In 1932 ZINSSER and CASTAÑEDA found that sera of patients convalescent from murine typhus agglutinated European and murine Rickettsiae. No correlation has been shown to exist between the Weil-Felix reaction and the presence either of Rickettsial agglutinins or protective antibodies.

The experiments recorded in the present paper suggest that Rickettsial agglutinins appear earlier than the Weil-Felix response, that they are more persistent and more specific and that they are correlated with the presence of protective antibodies.

Rabbits were used, 25 for the experiments dealing with Rocky Mountain spotted fever and 12 for those on louse-borne typhus. The animals were inoculated by the intraperitoneal route with suitably prepared cultures of Rickettsiae grown on agar with chick-embryo tissue. The same cultures were used in the preparation of suspensions for the agglutination tests. Some of the animals received weekly injections for 4 to 20 weeks, others were given only two to three injections at three-day intervals. The protective tests were made by mixing 1 ml. of virulent passage blood with varying amounts of rabbit serum which had been stored for several weeks in the ice chest; the mixtures were injected intraperitoneally into guineapigs.

A typical immunological response following three injections of spotted fever Rickettsiae at three-day intervals is shown in the following table:—

Time of bleeding	Agglutination titre		Blood infectious	Protective antibodies	
	Weil-Felix	Rickettsial agglutination		Amount of serum	Response
1 week ...	0	1–80	Yes	1·0 ml.	Absent
2 weeks ...	1–160	1–1,280	No	1·0 ml.	Present
3 weeks ...	1–80	1–1,280	No	1·0 ml.	Present
6 weeks ...	0	1–1,280	—	—	—

A very similar type of response was shown by rabbits which had received weekly injections of typhus Rickettsiae. In all the experiments the antibodies appeared in the same sequence; Rickettsial agglutinins always appeared first, from the fifth to the eighth day; they always reached a titre of 1–1,000 or more; next the Proteus agglutinins appeared, from the seventh to the fourteenth day; in a few cases the Weil-Felix reaction was negative throughout. Between the twelfth and the eighteenth day the protective antibodies appeared in a high degree of potency and the rabbit's blood no longer contained living virus. Despite weekly injections the Proteus agglutinins dropped to zero in one to five weeks, whereas the Rickettsial agglutinins and the protective antibodies remained at a high level for at least seven months, even after the inoculations had been discontinued.

Studies in progress on human sera from cases of spotted fever showed a similar reduction or disappearance of the Weil-Felix response during convalescence and the persistence of Rickettsial agglutination in cases in which the Weil-Felix response had become negative.

If further tests in human cases should show that the Rickettsial agglutination response appears earlier than the Weil-Felix reaction the former test will be valuable in this respect and in being more specific than the latter, especially in areas in which both louse-borne typhus and Rocky Mountain spotted fever occur.

John W. D. Megaw.

Klose (H.). Zur Epidemiologie des Fleckfiebers. [**On the Epidemiology of Typhus Fever.**]—*Klin. Woch.* 1942. May 30. Vol. 21. No. 22. pp. 498–500.

Several examples are given of outbreaks of typhus fever among the personnel employed in prison camps in spite of conditions which

exclude the possibility of infection being conveyed by the bites of infected lice. The only conceivable way in which infection could have been conveyed was by the faeces of infected lice, in which Rickettsiae are known to survive for long periods of time even after disinfestation with cyanide gas has been carried out. The dried faeces of lice may adhere to the skin or clothing of patients, but further research is needed to show whether the infection is conveyed directly through the skin, by the inhalation of infected dust, or by "smear infection."

In any case, delousing, even when repeated thrice at intervals, is not a sufficient safeguard. Effective disinfection of the skin by chemical antiseptics and of the clothing, bedding, mattresses, etc., by steam sterilization or dry heat is essential. *John W. D. Megaw.*

STEUER (W.). Ueber serologische Umgebungsuntersuchungen bei epidemischem und endemischem Fleckfiebervorkommen. [**Local Serological Investigations into the Occurrence of Epidemic and Endemic (Louse-borne) Typhus Fever.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1942. Feb. 25. Vol. 101. No. 2. pp. 102–121.

This important paper deserves close study by all who are interested in the epidemiology of typhus fever.

The recently devised dry-blood agglutination test ("Tr. BA test") of Kudicke and Steuer [see this *Bulletin*, 1942, Vol. 39, p. 372] enables workers to carry out a rapid survey on the spot for the purpose of discovering the existence of atypical, mild and unrecognized forms of the disease. A *Proteus OX19* suspension, killed by heat at 75°C. and preserved by the addition of alcohol to the extent of 20 per cent., keeps for at least five months.

The first survey was made in the district of Krakow in Poland in 13 out of 26 localities in which epidemics occurred, mostly in the months of April, May and June, 1941. In these localities 544 cases were reported with 64 deaths. Altogether 879 persons were tested: of these 642 were recent immigrants. Of 26 persons who gave a history of having had typhus fever between 1912 and 1939 only three gave a weak reaction; the rest were negative. Of 29 persons convalescent from typhus 25 were positive. In 10 active cases tested between the second and the ninth days the response was negative.

The general results show 200 positive and 679 negative reactors. Included among the negatives were 20 patients either in the febrile stage or recently convalescent, of whom six were ambulatory cases. The 200 positive cases were made up of 125 active cases and convalescents, 35 ambulatory cases, including some persons who had recently had some symptoms of disease, and 40 symptom-free persons, of whom three gave a history of previous attacks.

Detailed enquiries were made in the 41 ambulatory cases; most of these were in permanent residents of the localities. The usual story was that they had been having headache or fever, or both; some admitted only to having been out of sorts or unwell for a short time, they thought they had influenza or lumbago with catarrh; still others had no symptoms of any kind but they were found to have a spotted rash of a more or less pronounced type; nearly all gave positive reactions. The ambulatory cases accounted for about 8 per cent. of all the cases of typhus and were mostly in children; 18 belonged to the 3 to 10 age-group and 14 to the 11 to 15 age-group.

The epidemiological importance of these cases is shown by the frequent occurrence of typical attacks of typhus in the family or neighbourhood of the patients.

The 37 symptom-free reactors were also kept under observation; frequently the reaction was in moderate titres and so could be explained as being a non-specific or anamnestic reaction or as being due to a reinfection in an immune person. In six instances there were two reactors of this kind in the same family, and two brothers who gave weak reactions suffered a fortnight later from mild attacks of typhus. In some cases there was a rising Weil-Felix titre; for example one person who reacted in a titre of 1 in 200 was found four weeks later to have a titre of 1 in 3,200, although he had no symptoms; two members of his family had attacks of typhus at the time.

Other surveys were made in Krakow city, where only occasional sporadic cases of typhus were occurring. A group of 200 healthy Polish children was tested for "Tr. BA" and Weil-Felix reactions, all gave negative responses. On the other hand a group of 300 healthy Jewish children yielded 13 positives, the Weil-Felix titre being 1–200 or less. Altogether 1,080 healthy controls, including the above 500, were tested in Krakow and other places in the district in which no epidemics were known to have occurred in recent times; 42 reacted to the test, but none in titres higher than 1–200, whereas higher titres were often observed in symptom-free persons living in epidemic areas.

Another control survey was made in a large hospital [presumably in Krakow]; 1,000 patients suffering from other fevers were tested, only three reacted, of whom two gave Weil-Felix responses ±1–100, and one +1–100. No tests were made with lower titres in these cases.

A further control survey was made in 1,487 German soldiers suffering from various diseases: of these 1,339 were negative; 99 reacted at 1–50; 7 at 1–100±; 36 at 1–100; 1 at 1–200±; 2 at 1–200; and 3 at titres higher than 1–200. The last-mentioned three cases were closely investigated, in one of them the serum was haemolytic, and positive agglutination occurred against the organisms of abortus fever, Flexner dysentery and Shiga-Kruse dysentery in titres of 1–200 to 1–400; the second case proved later to be one of paratyphoid B; in the third week the Weil-Felix titre in this case was 1–100 and five days later it rose to 1–400; the third case was of a doubtful nature, but although typhus fever was excluded the titre rose from 1–200 to 1–6,400 within two days. In the two latter cases the rising titre was regarded as being anamnestic, in all probability, and as resulting from a previous infection with *Proteus X19*. No Proteus organisms could be found in the stool or duodenal fluid in either of the cases. The rising titre in these two cases could not be satisfactorily explained on the grounds of contact with typhus patients.

In the conclusions the following observations are made:—Children and young persons often suffer from mild and unrecognized attacks of typhus fever, sometimes even when they live in typhus-free localities and have had no previous contact with typhus patients. Adults in such localities sometimes have ambulatory attacks. A high-titre Weil-Felix reaction may occur without symptoms in children and young persons living in infected areas, even in the absence of previous attacks or protective inoculation. The Rickettsial agglutination response which has been found to occur in similar conditions needs further investigation. General surveys, not only of the families of reactors,

but also of the rest of the population, must be made when symptom-free reactors are discovered to exist. Ambulatory and latent cases must be segregated, deloused and kept under observation; they usually harbour infected lice. Whether lice become less intensively infected when they feed on persons with mild attacks than when they feed on severely affected patients is a point that needs further investigation.

John W. D. Megaw.

HALLMANN (L.). Serologische Schnellreaktion zur Fleckfieberdiagnose am Krankenbett. [**A Rapid Bedside Serological Test for Typhus.**]—*Deut. Militärarzt.* 1942. Mar. Vol. 7. No. 3. pp. 196–198. With 1 fig.

The test has been named the "Proteus Typhus-Fever Test." It has been claimed to be new in two respects: the employment of small drops of whole blood on a slide and the use of stained bacterial suspensions to facilitate the observation of agglutination. In both of these points the author has been anticipated, as can be seen by a reference to the paper by VEINTEMILLAS in June 1941 [see this *Bulletin*, 1942, Vol. 39, p. 141].

The reagents are: (1) A filtered alkaline solution of methylene blue (saturated alcoholic solution of methylene blue, 10 cc.; 1·0 per cent. solution of caustic potash, 1 cc. and distilled water, 100 cc.) (2) A 24 hour agar culture of *Proteus OX19* suspended in normal saline. The reagents keep for some time in the ice chest, but are brought to room-temperature before being used. Slides of opal glass are best, but plain slides placed on a white background will do.

A measured drop (0·05 cc.) of the stain is placed on the slide and 0·1 cc. of the bacillary suspension is mixed with it; then 0·05 cc. of freshly drawn whole blood is added and stirred in, making a pool of 2 to 3 cm. in diameter. The slide is tilted to and fro for four minutes. When the reaction is negative no change occurs in the original appearance of the suspension which is red-brown in colour; a positive reaction is shown by the formation of blue-green clumps of varying size. The reaction can be made quantitative by carrying out simultaneous comparative tests with the standard Weil-Felix method.

Comparative tests were made with the Weil-Felix reaction in 500 cases of proved typhus fever and a high degree of conformity was observed. In 100 samples of blood which had reacted to the Widal test 14 unexplained positives occurred in titres of 1–200 or less; the same number occurred with the Weil-Felix test.

Serum can be used instead of whole blood: in this case 0·03 cc. of serum is used instead of 0·05 cc. of blood. *John W. D. Megaw.*

GROOT (Hernando), MAYORAL (Pedro) & MARTINEZ (Luis Eduardo). Diagnostico y profilaxis del tifo exantematico en Nariño. [**The Diagnosis and Prevention of Typhus Fever in Nariño.**]—*Publ. Lab. Hig. Nariño.* Pasto. 1940–41. pp. 63–116. With 10 figs. (1 folding map). [Bibliography.]

More than half of this long paper consists of a survey of laboratory methods of diagnosis of diseases in general, the rest deals specially with the diagnosis and prevention of typhus fever, which has recently been found to be an important disease in the Nariño department of Colombia. The relative frequency of typhus in Nariño can be estimated from

the fact that of 299 specimens of blood sent to the local Laboratory of Hygiene between January 1940 and August 1941 nearly 10 per cent. were found to be from cases of this disease. Most of the blood specimens were inadequate, so that many cases are likely to have escaped detection. The other diseases diagnosed from the specimens were :—bartonellosis (18·3 per cent.), malaria (18·5 per cent.), typhoid fever and relapsing fever (1·0 per cent. each).

For the rapid diagnosis of typhus fever 0·05 cc. of serum diluted 10 times with saline is mixed on a glass slide with 0·1 cc. of a heat-killed suspension of *Proteus X19* preserved by the addition of 1·0 per cent. formol. Agglutination is shown by the formation of small clumps of bacilli which are easily seen with oblique illumination. Positive reactions with serum diluted 30 times are regarded as specific. Castañeda's method, in which Rickettsial suspensions are used in the same way, gives earlier, and usually stronger, positive results. Even the Castañeda protective vaccine can be used for this rapid test : 0·01 cc. of the vaccine is mixed with 0·05 cc. of a 1 in 10 dilution of serum ; the response is not so pronounced as with the special Rickettsial suspension.

In connexion with prevention it is stated that the incubation period may be as long as 23 days, so that all persons who have been in contact with a patient within that period must be deloused and kept under observation. Clothing for disinfestation is at once placed in a metal receptacle which is hermetically sealed after the addition of 50 cc. of petrol or benzene : after an hour's treatment the articles can safely be sent for complete disinfection. Attendants on patients or suspects wear rubber gloves and blouses, their arms and legs are rubbed with a mixture of 20 grammes camphor in 200 cc. oil.

The Castañeda killed vaccine, prepared from the lungs of mice inoculated with murine virus by the intratracheal route, has been selected for trial and has been used on 34 persons exposed to risk of infection in the laboratory ; none of the inoculated persons has yet been attacked. *John W. D. Megaw.*

VAN MEERENDONK. Erfahrungen ueber Fleckfieberbehandlung mit Atebrin und Plasmochin. (Vorläufige Mitteilung.) [**The Treatment of Typhus Fever with Atebrin and Plasmoquine.**]—*Deut. Militärarzt.* 1942. Apr. Vol. 7. No. 4. pp. 283–284.

In this preliminary report striking benefit is claimed to have resulted from the use of atebrin combined with plasmoquine in the treatment of a considerable number of cases of typhus fever.

The duration of the fever is said to have been reduced by several days ; the temperature usually fell by lysis instead of by crisis. The general course of the attacks was less severe than would otherwise have been expected. Specially satisfactory results were obtained in seven patients aged 42 to 49 years ; most of these would have been expected to die but for the treatment. Owing to shortage of plasmoquine, only patients over 40 years of age could be given the combined treatment, which was regarded as being more effective than that by atebrin alone.

When no striking response to the drugs occurred within a few days there was nearly always a complicating bronchopneumonia which yielded promptly to eubasinum [sulphapyridine] given intravenously.

Other drugs had previously been tried without effect : these included prontosil, pyramidon, neosalvarsan, convalescent serum and eubasinum. The dosage of atebrin was three tablets (0·06 gramme each)

thrice daily: plasmoquine was given once daily in doses of 0·02 gramme. [The Germans have increased their standard tablets of atebrin, for prophylaxis of malaria, from 0·05 to 0·06 gm., see this *Bulletin*, 1942, Vol. 39, p. 396.]

In some cases there was vomiting, but this could not be attributed with certainty to atebrin because most of the patients were also being treated with eubasinum for bronchopneumonia.

A further communication dealing with the clinical aspects of the cases is promised. *John W. D. Megaw.*

ZUPNIK (Dragutin). Fleckfieberbehandlung mit Plurazol (Sulfapyridin). Vorläufige Mitteilung. [**The Treatment of Typhus Fever with Plurazol (Sulphapyridine).**]—*Med. Klin.* 1942. Apr. 24. Vol. 38. No. 17. p. 396.

The claim for the effectiveness of sulphapyridine is based on the results obtained in 11 patients, all of whom recovered although two of the cases were of the fulminating and haemorrhagic type in which recovery would normally have been regarded as impossible.

In all the cases the temperature began to fall by lysis three to five days after starting the treatment, and reached normal after a further period of four to five days. There were neither complications nor relapses. The suggestion is made that the drug has a special action on the pneumococcal or streptococcal infections which are assumed to be responsible for some of the symptoms of the disease.

The dosage was two tablets (½ gramme each) five times daily for 10 to 14 days. This meant that the drug was continued for three or four days after the temperature had fallen to normal. In the summary the author states that all the patients recovered under treatment with plurazol in 10 to 12 days.

[Except for the two cases described as fulminating and haemorrhagic the results do not appear to be very convincing; other workers have reported that drugs of the sulphonamide group are useless or even harmful in typhus fever.] *John W. D. Megaw.*

WAR OFFICE: ARMY MEDICAL DIRECTORATE BULLETIN No. 12. 1942. May. 8 pp. **Typhus Exanthematicus.**

This is an excellent and succinct account of louse-borne typhus, with emphasis on the clinical aspect and some remarks on prevention. *C. W.*

FRAENKEL (E. M.). **Louse-borne Typhus Fever.**—*Med. Press & Circular.* 1942. May 27. Vol. 207. No. 21. pp. 343–348. With 2 figs. [12 refs.]

PLOTZ (Harry) & WERTMAN (Kenneth). **The Use of the Complement Fixation Test in Rocky Mountain Spotted Fever.**—*Science.* 1942. Apr. 24. Vol. 95. No. 2469. pp. 441–442.

In view of the practical difficulties connected with the differentiation between typhus fever and Rocky Mountain spotted fever the authors thought that a complement fixation reaction might be of value. No satisfactory antigen for Rocky Mountain fever complement fixation had previously been prepared.

In the present experiments antigens were made from tissue cultures grown by the semi-solid agar method in Kolle flasks. The original virus was obtained from the spleens of guineapigs and was grown in contact with ten-day chick embryo cells. After several weekly transplants the cultures became exceedingly rich in Rickettsiae; the antigen was prepared from the 25th to the 35th transplant. Details of the technique are given.

The final preparation contained a rich suspension of Rickettsiae. The usual haemolytic system was used.

Sera from 9 cases of Rocky Mountain spotted fever were tested: all gave positive complement fixation reactions (complete fixation with serum dilutions of 1 in 6 or more). The most recent case was at the 12th day of the illness, the others ranged up to 4½ years after the attack. All the controls were negative in dilutions of 1 in 3; they included 2 cases of Brill's disease, 11 of various febrile diseases, 8 Wassermann positives, 2 cases of Q fever, and 11 normal persons.

In guineapigs inoculated with Rocky Mountain virus, fixation was obtained with 8 sera though the average titres were not so high as in human beings. One guineapig became negative six days after the end of the fever, another was still positive after twelve days. No fixation was observed in guineapigs inoculated with endemic typhus (7 sera), epidemic typhus (6 sera), Q fever (3 sera) or in normal animals (15 sera). The reaction in guineapigs and monkeys is now being studied.

The results indicate that the complement fixation test may be employed in the diagnosis of Rocky Mountain spotted fever.

[This report, in conjunction with the recently published findings of Bengtson and her colleagues (see this *Bulletin*, 1941, Vol. 38, pp. 682, 690; 1942, Vol. 39, p. 146) suggest that the complement fixation test may be of great help in the differentiation of the various fevers of the typhus group.] *John W. D. Megaw.*

Gildemeister (E.) & Haagen (E.). Fleckfieberstudien. II. Mitteilung: Ueber die Züchtung der *Rickettsia mooseri* und der *Rickettsia prowazeki* im Dottersack des Hühnereies und ueber die Herstellung von Kulturimpfstoffen. [**The Cultivation of *Rickettsia mooseri* and *Rickettsia prowazeki* in the Chick Yolk Sac and the Preparation of Vaccines from the Cultures.**]—*Zent. f. Bakt.* I. Abt. Orig. 1942. Feb. 16. Vol. 148. No. 6. pp. 257–264.

Cox and others have already shown that vaccines prepared from yolk-sac cultures of the Rickettsiae of typhus fever are effective in the immunization of experimental animals.

Details are given in this paper of the preparation of vaccines from yolk-sac cultures of *R. mooseri* and *R. prowazeki*; greater difficulties were encountered in dealing with the latter organism than with the former, but the authors show how these were overcome. Although the vaccines have not yet been tested in human beings exposed to the risk of infection with typhus fever the results of animal experiments suggest that the egg-yolk vaccines will confer a degree of partial immunity equal to that produced by Weigl's vaccine. The chief advantage of the method is that large quantities of vaccine can be prepared without resorting to the elaborate and expensive technique involved in Weigl's method. Complete protection cannot be expected from any vaccine, since even an attack of the disease does not confer

complete immunity. Louse-control must still be the basic method of dealing with typhus fever but vaccines will play an important subsidiary part, especially in the case of those exposed to special risks in the course of their duties.

This paper ought to be consulted by every one engaged on the investigation of Rickettsiae; it contains a great deal of valuable information about the technical methods employed in the preparation of the vaccines, and tells of the pitfalls connected with the various procedures.

Following are a few of the special points: Laboratory workers are exposed to great risks, they must be protected by wearing rubber gloves and rubber aprons, and by working from behind a sheet of glass. The source of *R. mooseri* is the brain of a mouse infected by the intraperitoneal route; only mice in which Rickettsiae have been found in smears made from the peritoneum are used. *R. prowazeki* was obtained from the brains of infected guineapigs: of 11 series of egg-yolk inoculations with this organism six failed altogether; of the remaining five one died out after seven egg-passages, another was used for 11 passages but was abandoned because few Rickettsiae were found, another became contaminated with bacteria after 19 passages; the other two were still active after 16 and 44 passages respectively. Yolk sacs heavily infected with *R. prowazeki* were shaken for 24 hours, filtered through gauze and heated for an hour at 52° to 54°C.; they were then tested for bacteriological purity and made up in a suspension with carbolized Ringer's solution. The final product, which consisted of 5 to 10 per cent. of yolk sac, was kept for four weeks; fresh suspensions caused rather severe reactions [see also BERGE and HARGETT below, p. 686]. Yolk sacs from embryos which had died were not used. No method of titration of the vaccine has yet been worked out and the dosage is not mentioned.

The fertility and hatching rate of the eggs employed were better from April to August than during the rest of the year. [Compare this method of preparation with that described by COX, this *Bulletin*, 1942, Vol. 39, p. 381.] *John W. D. Megaw.*

FINDLAY (G. W. M.). **Control of Rickettsias: Immunisation against Infection.**—*Lancet.* 1942. Apr. 18. pp. 483–484. [17 refs.]

A brief account of the methods attempted, all of which have been noticed in this *Bulletin.* *C. W.*

LANCET. 1942. Apr. 25. pp. 506–507.—**Typhus Immunization.** [17 refs.]

BARTONELLOSIS.

GARCIA CABALLERO (Antonio) & MAYORAL (Pedro). La bartonellosis humana o enfermedad de Carrión en Chile. **[Carrión's Disease in Chile.]**—*Publ. Lab. Hig. Nariño.* Pasto. 1940–41. pp. 181–195.

This is an interesting paper. The authors refer to four patients with nodular growths which had been diagnosed as von Recklinghausen's disease. The swellings ranged from the size of a lentil to that of a

kidney bean, scattered generally over the body. Having a suspicion as to the nature of these small tumours they excised one and found none of the pathological changes of von Recklinghausen's disease, but those characteristic of verruga peruana. Examination of the blood did not discover any Bartonella. They speak of five forms of Bartonellosis.

H. Harold Scott.

GROOT (Hernando), MAYORAL (Pedro) & MARTINEZ (Luis Eduardo). Bartonellosis y fenomeno de Mooser. [**Bartonellosis and the Mooser Phenomenon.**]—*Publ. Lab. Hig. Nariño.* Pasto. 1940–41. pp. 39–42. With 2 figs.

The Mooser phenomenon is given irregularly in inoculation of guinea-pigs with blood of patients with Bartonellosis or with cultures of the organism obtained from patients. If present, it is fairly well marked by the third day, reaches a maximum in a little over a week, and disappears in another 7–10 days. The authors inoculated 37 young animals: 4 with 1 cc., 4 with 3 cc., 2 with 4 cc., 15 with 5 cc., and 12 with 6 cc. Eight showed the scrotal reaction, six on the third, two on the fourth day. The blood of a patient inoculated into 11 guineapigs produced the reaction in one, not in the others, 5 cc. were used. In another case of four inoculated two reacted. It was never observed if less than 3 cc. was injected.

H. Harold Scott.

GROOT (Hernando), MAYORAL (Pedro) & MARTINEZ (Luis E.). Resumen de observaciones y estudios sobre bartonellosis. [**Studies in Bartonellosis.**]—*Publ. Lab. Hig. Nariño.* Pasto. 1940–41. pp. 9–38. With 6 figs.

A general paper on the subject of Carrión's disease dealing with cultivation of Bartonella, the results of inoculation, the formol-gel and flocculation reaction, the blood changes, histology of the nodules, diagnosis and treatment, including prophylaxis. It contains nothing beyond what is to be found in modern text-books.

H. Harold Scott.

YELLOW FEVER.

SAWYER (Wilbur A.). La fiebre amarilla en las Américas. [**Yellow Fever in the Americas.**]—*Bol. Oficina Sanitaria Panamericana.* 1942. Apr. Vol. 21. No. 4. pp. 320–334. With 1 map. [16 refs.]. English summary.

"After noting that the outstanding characteristics of the historic yellow fever picture were sudden epidemic extensions of the disease far beyond known endemic foci followed by absence of the disease or relative quiescence, the author discusses the oustanding features of the yellow fever situation in the Americas: (1) absence of definite outbreaks of urban, aegypti-transmitted yellow fever anywhere, (2) absence of recognized yellow fever of any transmission type outside of South America, (3) jungle yellow fever, endemic and as *migrating* epidemics in wide areas of the interior of South America, (4) effective

methods for keeping cities non-infectible through *Aedes aegypti* control, and (5) a safe and effective way to immunize against yellow fever and prevent its spread from the jungle to infectible cities. The results of the world-wide yellow fever immunity surveys carried out since 1931 by employing mouse protection tests of human sera are summarized for the Americas, showing, among other things, that yellow fever may have existed in Mexico as late as 1925, in El Salvador to 1924, in Costa Rica to 1910, and possibly as late as 1927 in Panama. The author observes that if yellow fever exists in Central America it will probably be found in the San Blas region of Panama close to South America, and a cooperative program including viscerotomy, protection tests and supplementary studies is being carried out by the Panama Government and the Rockefeller Foundation. While the reader is referred to the reports of Soper for complete information on jungle yellow fever in South America, mention may be made of the fact that the wild Brazilian forest mosquitoes *Aedes leucocelaenus* and *Haemagogus capricorni* have been observed to contain yellow fever virus and to be capable of infecting rhesus monkeys by biting; and also of the apparent shifting of epidemics from one region to another in both Brazil and Colombia.

"As to prevention, the author commends the *Aedes aegypti* control work (begun by Gorgas and Oswaldo Cruz) carried out in American cities, and recalls that this control, by keeping the city of Rio de Janeiro non-infectible, possibly prevented a serious epidemic of yellow fever in 1938 following the entrance into that city of four persons infected in the jungle areas. The chief features of these control methods, as described by Soper, include the weekly inspection of premises for *A. aegypti* larvae, the destruction of breeding places, and the search for additional mosquitoes by special squads, with finding and destruction of breeding foci if mosquitoes are found; the application of petroleum (3 parts fuel oil and 1 of kerosene) is recommended as being more effective than merely emptying out the water. Breeding has been so greatly reduced by such methods that in many cities it has been possible to lower the cost of the service by lengthening the period between house inspections. The author remarks that while the urgency of precaution increases with the proximity to jungle yellow fever, the critical distances have been greatly extended by the increased rapidity of travel, especially by airplane, and that cities and towns through which yellow fever must pass in order to spread from jungle areas or to invade an uninfected country have a special responsibility for keeping themselves non-infectible. Authorities must be able to recognize yellow fever immediately if it should appear, particularly if adequate steps have not made their cities non-infectible. While the clinical diagnosis may sometimes be all that is posssible before the first precautionary measures have to be taken, the final identification may be facilitated by such modern diagnostic aids as (*a*) in mild cases, drawing of blood as early as possible during the acute disease and again three weeks after onset, and examining both sera by means of the mouse protection test; if the first specimen does not protect against yellow fever and the second does, the case was yellow fever, whereas if neither or both specimens give definite protection, the illness must have been some other disease; (*b*) in more serious investigations, attempts to isolate the virus from cases during the first three days of illness by injecting blood serum from the sick person intracerebrally in amounts of 0·03 cc. into six susceptible mice, taking great care to prevent

infectious blood from coming into contact with the hands of a non-immune investigator ; and (*c*) in fatal cases, securing of a specimen of liver by autopsy or viscerotome puncture, sending it in 10 per cent. formalin to a pathologist acquainted with yellow fever lesions. Determination of yellow fever in an individual case should be merely one step in the thorough epidemiologic investigation of an outbreak.

"While cities may be kept free of infection by *Aedes aegypti* control, vaccination is the only measure practicable against jungle yellow fever. To date it has been applied on a large scale mostly to stop an existing epidemic or to immunize against an expected one. In Colombia much thought is being given to the immunization of selected communities to prevent the possible future spread of nearby jungle yellow fever through them, and at the same time vaccination is made available to the usually few people under actual exposure in jungle areas—an important measure, for it is the non-immunes working in the jungle who will become infected and bring yellow fever into the towns. While the vaccine (17D) now used in the Americas is both safe and effective, experience has shown that eternal vigilance is needed to keep this living vaccine at a low level of virulence and free from contaminating virus and at the same time to avoid any fall in immunizing power. The use of chick embryo tissues in place of brains of living mice in producing the vaccine has increased the element of safety by reducing the risk of introduction of an unknown pathogenic virus. The possibility of the introduction of an unknown virus into the vaccine from the blood of apparently healthy human donors is being dealt with by inactivating with heat the human serum used in the tissue cultures. Any reports of jaundice or other symptoms following vaccination are being carefully investigated. Following demonstration of the ineffectiveness of certain lots of living virus vaccine which had undergone over 300 passages in tissue culture, whereas viruses passaged only from 229 to 255 times had been very successful, experimental tests of the effects of passage are being made in Colombia, New York and Brazil, and new lots of vaccine are first being tested on small groups of people before being used in the field."

LEWIS (D. J.), HUGHES (T. P.) & MAHAFFY (A. F.). **Experimental Transmission of Yellow Fever by Three Common Species of Mosquitoes from the Anglo-Egyptian Sudan.**—*Ann. Trop. Med. & Parasit.* 1942. June 30. Vol. 36. Nos. 1 & 2 pp. 34–38.

Three species of *Aëdes*, *A. taylori* Edwards, *A. metallicus* Edwards, and the pale form of *A. aegypti* L., all common in the Sudan, were transported from there to Entebbe, where experiments were carried out to see if they could transmit yellow fever.

Rhesus monkeys were infected with the Asibi strain of the virus and when they showed a temperature of 104°F. or more, batches of the mosquitoes were fed on them and after periods varying from 8 to 9 days at 24° to 26°C., allowed to bite normal monkeys. In nine cases rhesus monkeys were used and all the animals became infected and died of yellow fever, and in the other two experiments Cercopithecus monkeys were used and both became immune.

It is evident that all these species are efficient carriers, and *A. taylori* and *A. metallicus* are abundant in the Nuba mountains where yellow fever occurred in epidemic form in 1940. [See KIRK, this *Bulletin*, 1942, Vol. 39, p. 69.] *E. Hindle.*

SMITH (E. C.). **Hepatic Findings excluding Yellow Fever in Fourteen Cases of Jaundice in West Africa.**—*Ann. Trop. Med. & Parasit.* 1942. June 30. Vol. 36. Nos. 1 & 2. pp. 38–46. With 10 figs. on 5 plates. [12 refs.]

Clinical and histological notes of 14 cases clinically suggestive of yellow fever. In six of these cases the histological findings were considered to be those of subacute necrosis. The occurrence of extensive Councilman lesions, of calcified cysts and of sicklaemia is also noted in some of the cases.

The author gives details of all these cases, in which knowledge of the aetiology of the conditions is practically nil. They are of especial interest as exemplifying the variety of conditions producing changes in the liver which are liable to cause confusion in the diagnosis of yellow fever. *E. Hindle.*

BERGE (T. O.) & HARGETT (M. V.). **Anaphylaxis in Guinea Pigs following Sensitization with Chick-Embryo Yellow Fever Vaccine and Normal Chick Embryos.**—*Public Health Rep.* 1942. May 1. Vol. 57. No. 18. pp. 652–667. With 2 figs. [19 refs.]

The increasing use of vaccines prepared from fowl embryonic tissues and the probability of repeated injections of these products into human beings, lends a special interest to the results of this investigation on the production of an anaphylaxis in guineapigs following the injection of fowl embryo yellow fever vaccine and of normal fowl embryo tissue.

"In general, the method of preparation of these vaccines was similar in all essentials. Eggs were incubated for 7 to 11 days and the living embryos inoculated with the 17–D strain of attenuated yellow fever virus developed by THEILER and SMITH. After an additional incubation for 3 days, the still living embryos were removed aseptically from the shells and ground to a fine pulp in blenders cooled with dry ice. If a diluent was to be used, either normal human serum or distilled water was added, or, in the case of 100 per cent. embryo vaccines, no diluting fluid was employed. These preparations were then centrifuged in an angle centrifuge at from 3,500 to 3,700 r.p.m. for 30 to 60 minutes to remove tissue debris. The supernatant extract, constituting the finished vaccine, was dispensed in ampules, frozen in a dry ice-alcohol mixture, and stored at minus 23°C."

The author injected guineapigs with yellow fever vaccines prepared from 10 to 14 day old fowl embryos, some with an aqueous base, and others with a human serum base. Sensitization experiments were also done with 8 to 14 day old normal fowl embryo extracts. A sensitizing dose of 0·05, 0·1 or 0·2 ml. of the various antigens was given subcutaneously, and after an interval of 21 to 23 days, a challenging dose of 0·1 or 0·2 ml. The results show that the percentage of animals showing anaphylaxis increases with the age of the embryo used as antigen, and doses which sensitize guineapigs against 14-day material fail to produce sensitization against 10-day extracts. If these results are applicable to human beings, the probability of sensitization with biological products prepared from fowl embryos would be greater when 13 or 14 day embryos are used than when younger embryos are employed. *E. Hindle.*

PLAGUE.

MOLL (Arístides A.) & O'LEARY (Shirley). **Plague in the Americas. IX. Uruguay.**—*Bol. Oficina Sanitaria Panamericana.* 1942. Mar. Vol. 21. No. 3. pp. 245–252. With 1 map & 1 chart. [Refs in footnotes.]

URUGUAY.—It is currently accepted that Uruguayan waters, with the arrival of the *Zeier* out of Rotterdam with a cargo of rice in 1899, were the scene of entry of plague into South America. It was not, however, till 1901 that rats in Montevideo were found infected and a human case at the same time. The usual sequence of plague in rats before its appearance in human beings has frequently been observed in Uruguay. Human plague has been mainly bubonic, although some cases of pneumonic and some of septicaemic plague have been reported. Both vaccination and serum-therapy have been used in combating outbreaks. *W. F. Harvey.*

JUNIOR (Marcello da Silva). *Pasteurella pestis.* Infecção pestosa nos roedores e em outros animais. Peste e tularemia. [*Pasteurella pestis* **in Rodents and Other Animals. Plague and Tularaemia.**]—*Folha Med.* 1942. Jan. 5. Vol. 23. No. 1. pp. 4–11. With 1 chart.

These are notes of the course of lectures given at the Institute of Public Health of Oswaldo Cruz. They set out all the bacteriological characters of the plague bacillus fully and systematically. Tularaemia is treated similarly, but with special reference to its resemblances to plague. *W. F. Harvey.*

PLUM (D.). **The Plague Epidemic in Nairobi, with Special Reference to Place Incidence and Treatment.**—*East African Med. Jl.* 1942. Apr. Vol. 19. No. 1. pp. 3–9.

During a period of 12 months 547 cases of plague were admitted to the two civil hospitals of Nairobi—the Native Civil Hospital and the Infectious Diseases Hospital. The Native Civil Hospital dealt with 134 of the cases, chiefly pneumonic or septicaemic, and 127 died. Of the 413 cases at the Infectious Diseases Hospital 13 were septicaemic (*i.e.* showed bacilli in a thin blood smear) and 12 pneumonic; there were only 227 deaths. Treatment at both hospitals was by Dagenan (M. & B. 693, sulphapyridine) and the author concludes from his clinical experience that Dagenan if "used in sufficiently large and frequent doses in an early case of bubonic plague acts almost as a specific." The average dosage was four tablets [each of 0·5 gm.] on admission and then two tablets every two hours until the temperature remained normal for 24 hours. *W. F. Harvey.*

VINT (F. W.). **The Pathology of Plague.**—*East African Med. Jl.* 1942. Apr. Vol. 19. No. 1. pp. 9–14.

Although gerbils and other field rodents do suffer from plague it is the house rat which is primarily responsible everywhere for human plague epidemics, and in Kenya there is no evidence to show that "any wild animals other than rats harbour plague" [see this *Bulletin*, 1939, Vol. 36, p. 965]. It is a mistake to classify plague into the separate

forms of bubonic, septicaemic and pneumonic. Thus in bubonic plague there is an initial, if transient, bacteriaemia and always a terminal septicaemia, while pneumonic plague ends by becoming septicaemic. Post mortem examinations show extravasations of blood of a jet black colour, which contrast with the bright red colour in other septicaemic conditions. The liver shows tiny miliary abscesses, slightly yellowish and consisting of necrotic liver tissue with plague bacilli.

Some practical points are recorded at the end of the article: (1) It is useless to examine for plague rats which have been caught in a baited trap. The plague rat is sick and is not attracted by food into a trap. (2) Dead rats, in which plague bacilli may most readily be found, are often decomposed. In that case bone marrow smears should be examined. *W. F. Harvey.*

DE SMIDT (F. P. G.). **The Laboratory Diagnosis of Plague Infections.**—*East African Med. Jl.* 1942. Apr. Vol. 19. No. 1. pp. 15–25.

Buboes.—The material taken must be from the gland substance itself and not from the surrounding oedematous tissue. It is advisable to aspirate in several directions because the bacilli are not uniformly distributed throughout the gland. If suppuration has taken place plague bacilli may be absent microscopically.

Blood.—Growth in blood culture should be apparent in 48 hours and the Gram-negative bacilli, which are non-motile, should not be confused with the actively motile typhoid or Salmonella organisms.

Sputum.—A pair of pneumococci may be mistaken for a plague bacillus with its bipolar staining. Friedländer's bacillus may bear a close resemblance to *P. pestis*, even to a very perfect bipolar staining. Cultivation easily differentiates the two organisms and plague bacilli in sputum are characteristically present in abundance, contrasting with the sparseness of Friedländer bacilli.

Post Mortem tissues.—Smears should be made from the spleen and from all enlarged glands that can be found. Care must be taken not to mistake the central spore of a putrefactive organism for the bipolar staining of a plague bacillus. All such spore-bearing organisms are Gram-positive.

Rats.—The typical post mortem signs are an enlarged, engorged, dark, friable spleen; red serous membranes of dull lustre with petechial or diffuse haemorrhages; blood-stained fluid in the pericardial, pleural and peritoneal sacs; enlargement of the suprarenals; enlargement and engorgement of the liver, sometimes with white miliary foci of necrosis; enlargement of glands especially in the cervical region. *W. F. Harvey.*

DOWDESWELL (R. M.). **Plague Vaccine.**—*East African Med. Jl.* 1942. Apr. Vol. 19. No. 1. pp. 26–29.

WRIGHT (F. J.). **Some Unusual Clinical Manifestations of Plague.**—*East African Med. Jl.* 1942. Apr. Vol. 19. No. 1. pp. 29–33.

These unusual clinical manifestations of plague were: (1) The tonsillar and pharyngeal type in which such diagnoses as diphtheria, follicular tonsillitis or Ludwig's angina may be made; (2) the carbuncular type in which skin and subcutaneous tissues are involved; (3) the cerebral type with symptoms, such as delirium or unconsciousness, pointing to a brain lesion. *W. F. Harvey.*

GOLDSTEIN (G.). **Clinical Aspects of the Lung Complications of Plague.**—*East African Med. Jl.* 1942. Apr. Vol. 19. No. 1. pp. 33–38.

There is little doubt that the diagnosis of pneumonic plague may be difficult. Such symptoms as dyspnoea, increased frequency of respiration, cough of dry type, by the second day becoming loose with free expectoration of blood-stained sputum, are among those mentioned. The most characteristic sputum is thin, bright red and contains large numbers of plague bacilli. In the earliest stages there may be little to suggest pneumonic plague except a marked discrepancy between "almost negligible physical signs and the gravity of the patient's condition." And yet these symptoms are not to be regarded as invariable; they may be absent altogether. Sputa may not contain bacilli; patients may complain of abdominal pain so as to suggest an acute abdomen. The pulse rate may be remarkably low and the respiration rate may not exceed 36 to 40. "Most patients looked very ill, some were prostrate but also from this rule there were remarkable exceptions." Instead of being thin the sputum may be sticky and mucopurulent. "With regard to prognosis conclusive evidence of pulmonary involvement, as shown by positive sputum or lung puncture, is of very grave significance." *W. F. Harvey.*

ALVARADO (Carlos Alberto). Procedimiento sencillo para el diagnóstico bacteriológico post-mortem de la peste humana. [**A Simple Procedure for the Post Mortem Diagnosis of Human Plague.**]—*Bol. Oficina Sanitaria Panamericana.* 1942. Feb. Vol. 21. No. 2. pp. 129–132. English summary.

"The post-mortem diagnosis of plague in isolated regions remote from medical services presents a problem not entirely solved by the usual methods of obtaining material for diagnosis: removal of a piece of infected tissue or rib, or by viscerotomy or visceral puncture. All of these methods require special instruments and a high degree of skill. These difficulties may be overcome by the simple procedure of cutting off a finger (the forefinger being the easiest to amputate), since the marrow of the phalanx invariably contains a sufficient quantity of germs for the identification of *B. pestis*, when the patient has died of plague. The finger is disinfected with alcohol, and then removed with any type of knife. Rubber gloves are not necessary. The small wound on the hand of the corpse may be covered with cotton dipped in formalin, and a bandage, or the hand may merely be placed beneath the clothing. The amputated finger is placed stump down in a clean bottle or other container, which need not be hermetically sealed, since a small piece of absorbent cotton placed in the bottom will absorb any fluid. At the laboratory, the usual technique is then followed, although the extraction of the phalangeal may be more difficult than that of rib marrow, due to its smaller size and hard bone. If the cross section does not provide enough material, the bone may be opened lengthwise.

"Use of this procedure is suggested in organized plague work along lines similar to those of viscerotomy service. Through compulsory 'digitotomy' in all cases of persons dying of an acute illness of less than 10 days duration, early discovery of new foci, and recognition of clinically atypical cases are possible."

CHOLERA.

BHATTACHARYA (A. K.) & GUPTA (B. P.). **Studies in the Last Cholera Epidemic at Moradabad.**—*Jl. Indian Med. Assoc.* 1942. Mar. Vol. 11. No. 6. pp. 177–180.

The epidemic of 59 cases in 1940 with 35 deaths occurred, as it usually does in Moradabad, during the rainy season. Deficient rainfall (29·6 inches) had been the experience in 1939 and the rainfall of the year 1940 itself was 40·35 inches. A table of 29 cases is given with details of age, sex, treatment by either intravenous or subcutaneous salt solution, occurrence of uraemia and final result; there were nine deaths. Two of the patients were pregnant and recovered without abortion. Treatment by the mouth was mainly by large quantities of kaolin in iced water; this was given to most of the patients in addition to the salines. *W. F. Harvey.*

GHOSH (H.) & MUKERJEE (S.). **Presence of *B. coli* Agglutinin in Serum of Cholera Cases and the Possible Role of *B. coli* in Cholera.**—*Ann. Biochem. & Experim. Med.* Calcutta. 1941. Mar. Vol. 1. No. 1. pp. 99–100.

It has been observed that when sterile filtrates of cholera stool are injected into rabbits, considerable amounts of *Bact. coli* agglutinins are found in their sera. This led the authors to the supposition that *Bact. coli* might undergo autolysis in the alkaline intestinal contents in the early stages of cholera, and that the products of this autolysis might be absorbed and play a part in aggravating the symptoms. Blood and stool were collected from convalescent cholera patients, *Bact. coli* were isolated and agglutination tests carried out against the autogenous *Bact. coli* and against an Inaba strain of *V. cholerae.* In 35 cases all the bloods agglutinated *V. cholerae,* and 25 agglutinated autogenous *Bact. coli*; in 50 healthy controls only 14 agglutinated autogenous *Bact. coli*; in 20 patients with typhoid only six agglutinated autogenous *Bact. coli.* From these results it is clear that the sera of the cholera patients contained more agglutinins for *Bact. coli* than those of the other groups, and this lends *prima facie* support to the authors' views. *C. W.*

BACILLARY DYSENTERY.

MACUMBER (Harold H.). **Acute Bacillary Dysentery. A Clinicopathologic Study of Two Hundred and Sixty-Three Consecutive Cases.**—*Arch. Intern. Med.* 1942. Apr. Vol. 69. No. 4. pp. 624–635. With 5 charts.

During the past 11 years 263 cases of acute bacillary dysentery have been recorded at the Gorgas Hospital; all diagnoses were confirmed by cultures from faeces.

Males outnumbered females almost 2 : 1. Negroes predominated (57 per cent.). Convulsions were reported in eight children, with high fever. Abdominal tenderness was present in 52 per cent., distension rarely. Total white blood cell and differential counts varied widely.

In 90 per cent. leucocytes were between 4,000 and 13,000; the average being 8,760. Organisms recovered from stools: Flexner 91 per cent., Sonne 6·5 per cent. No Shiga infections were encountered. Polyvalent serum was given in 52 per cent., but failed to reveal any concrete evidence of therapeutic value.

The mortality of this series was 6·5 per cent.; it was greatest amongst the aged (40 per cent.) and next in children (15–20 per cent.). In those aged 6–60 the death rate was only 2·4 per cent. The death-rate in Sonne infections was greater than that in Flexner cases.

P. Manson-Bahr.

COMPTON (Arthur). **Results of Bacteriophage Treatment of Bacillary Dysentery at Alexandria. A Statistical Retrospect.**—*Brit. Med. Jl.* 1942. June 13. pp. 719–720. With 2 figs.

In this (abridged) paper are presented the results of a statistical investigation of the mortality rates from dysentery from 1928 to 1940. The results are shown in the accompanying graph. In Alexandria phage therapy has been extensively employed; in Cairo and the rest of Egypt phage therapy is either not used at all, or on a very much smaller scale than in Alexandria. In all these figures for dysentery there is no differentiation, in official statistics, between bacillary and amoebic infections, but it is considered that the incidence of amoebic dysentery, and the use of emetine in treatment, are so constant

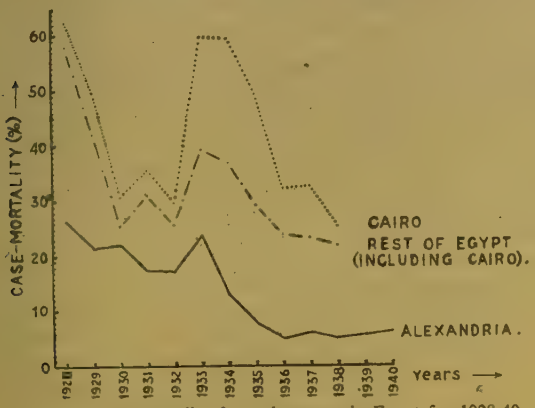

FIG. 1.—Case mortality from dysentery in Egypt for 1928-40.

[Reproduced from the *British Medical Journal.*]

throughout that they can be disregarded. During the same period the case mortality from typhoid has shown no decline. The author maintains that the fall in case mortality in Alexandria, compared with the continuing high case mortality elsewhere in Egypt, reflects the value of phage treatment.

In Alexandria it has become the established custom to treat bacillary dysentery, or acute enteritis, with 2·0 cc. bacteriophage as soon as possible, and thereafter the same amount every 4 hours, the patient being in bed and taking Vichy or Evian water only for 24 hours.

In a previous paper [this *Bulletin*, 1942, Vol. 39, p. 36] the author stated that " a good dysentery and meta-dysentery phage preparation, alternating with a like ampoule of a good Salmonella and coliform phage preparation every four hours " was used. *C. W.*

LYON (George M.). **Chemotherapy of Acute Bacillary Dysentery.**—*Southern Med. Jl.* 1942. June. Vol. 35. No. 6. pp. 606–611.

INTESTINAL PROTOZOAL INFECTIONS.

O'DONOVAN (D. K.), MCGRATH (John) & BOLAND (S. J.). **Giardial Infestation with Steatorrhoea.**—*Lancet.* 1942. July 4. pp. 4–6. With 2 figs. [10 refs.]

The case described is that of a boy, 9¼ years of age, whose chief complaints were retardation of growth, attacks of diarrhoea with bulky and pale stools, persistent craving for sugar and relatively enormous appetite, vague abdominal pains, particularly in the left iliac fossa. The patient was undersized. Examination of the abdomen by X-rays showed deformity of the mucous-membrane relief of the lower part of the small intestine. Analysis of the stool showed excess of fat crystals. A diagnosis of steatorrhoea was made. Since in a previous fatal case of this condition in a man, large numbers of giardia and widespread destruction of the epithelium of the small intestine had been discovered at post mortem examination, search for the flagellate was made in the case of the boy. It was only after the administration of a strong saline purge that numerous cysts were found in shreds of mucus in the stool. During the weeks following the purge the diarrhoea subsided, while microscopically the stools became normal. Flagellates were not again found, even after administration of a purge. Twelve months later there had been no return of diarrhoea or abdominal pain. There was no change, however, in the intestine as revealed by X-ray examination. It is concluded that some cases of so-called idiopathic steatorrhoea may have been due in the first place to injury of the intestinal epithelium by a transient giardial infection.

[Unfortunately little evidence is available that the giardia, which inhabit the upper parts of the small intestine, were responsible for the condition of the intestine or the steatorrhoea in either of these cases.]

C. M. Wenyon.

RELAPSING FEVER AND OTHER SPIROCHAETOSES.

ROBINSON (G. G.). **The Penetration of Pyrethrum through the Cuticle of the Tick,** *Ornithodorus moubata* **Murray (Argasidae).**—*Parasitology.* 1942. May. Vol. 34. No. 1. pp. 113–121. With 3 figs. [12 refs.]

This paper forms part of a study of the action of insecticides on the tick *Ornithodorus moubata.* When the larva of this tick has emerged from the egg it remains motionless for about four days, after which the

first moult takes place. If the immobile larva is immersed in, or sprayed with, oil containing pyrethrum it soon begins to move the legs. The rapidity with which this response occurs has been used by the author as a measure of the rate of penetration of pyrethrum through the cuticle. Thus it is found that, except with concentrated solutions, there is a logarithmic relation between concentration and the speed of entry; that penetration is slower as the larva gets older, probably because the cuticle increases in thickness; and that mineral oils induce swifter penetration than vegetable oils. *V. B. Wigglesworth.*

VARGAS (Luis) & ZOZAYA (José). La sulfadiazina, la sulfapiridina y la sulfanilamida en la infección experimental del ratón por *Borrelia recurrentis*. [**Sulphadiazine, Sulphapyridine and Sulphanilamide in Experimental** *S. recurrentis* **Infections.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1941. Dec. Vol. 2. No. 3–4. pp. 303–310. English summary (8 lines).

"1. Sulphadiazine, sulfapyridine and sulfanilamide did not modify the experimental infection in mice with a strain of *Borrelia* [*Spirochaeta*] *recurrentis* recently isolated in the city of Aguascalientes.

"2. The dosage of sulfadiazine and sulfapyridine was 45 mgs. daily, and sulfanilamide 40 mgs., in both cases the dosage was close to its lethal value.

"3. We failed to infect mice orally, using titrated spleen, liver and heart suspended in Locke-fluid."

BROWN (Thomas McP.) & NUNEMAKER (John C.). **Rat-Bite Fever. A Review of the American Cases with Revaluation of Etiology; Report of Cases.**—*Bull. Johns Hopkins Hosp.* 1942. Mar. Vol. 70. No. 3. pp. 201–327. With 3 text figs., 3 charts & 36 figs. on 10 plates.

A comprehensive review of the problem of rat-bite fever in the U.S.A., with special reference to the relative importance of *Spirillum minus* and *Streptobacillus moniliformis*, as the aetiological factor.

A general historical résumé of the subject is followed by an account of rat-bite fever due to *Spirillum minus*—Sodoku—in which attention is again directed to the many possible sources of error in its diagnosis; especially the natural occurrence of spiral organisms in laboratory mice, rats and guineapigs. The authors recommend that all animals used for diagnostic tests should be examined at least twice before inoculation, and when mice are used four should be inoculated and a second group of four kept as controls, and re-examined if the inoculated group becomes infected.

The cases of Sodoku in the United States from 1916 up to the end of 1940, including only those from which an aetiological agent has been recovered, number 125, and are given in tabular form. This table extends Bayne-Jones's list and includes 40 cases reported for the ten years from 1931 to 1940.

These cases have been diagnosed mainly on clinical grounds and in only 17 has the spirillum been demonstrated by animal inoculation. In only 11 out of these 17 was rat-bite definitely the cause, the others being the result of mouse-bite, contact with dogs, cat-bite or cat-scratch, and trauma without any known animal contact. Out of the total number of 22 cases of spirillary rat-bite fever, serological tests

for syphilis in 17 patients gave 10 positive and 7 negative, but when 4 cases in which diagnosis was not confirmed by animal inoculation are eliminated it is found that only 7 of the 13 gave positive serological tests for syphilis.

The authors then consider the 104 cases of artificially induced infection by inoculation in the entire English literature, devoting especial attention to the 72 cases described by HERSHFIELD *et al.* [see this *Bulletin*, 1929, Vol. 26, p. 675]. Arthritis developed in 18 of these 72 cases, the elbow and ankle being most commonly involved.

The authors next discuss the history of *Streptobacillus moniliformis* which has been described under various names including *Haverhillia multiformis* and *Actinomyces muris*. It was originally described by Schottmüller (1914) as *Streptothrix muris ratti*, and the organism was cultured from the blood of a patient suffering from rat-bite fever. This name would seem to have priority, but the authors prefer the term *Streptobacillus moniliformis*, since this has been used in all the more important research work on the subject. The varied nomenclature has resulted in a confusion of different infections and the authors tabulate 22 examples of various names and sources of this organism.

A discussion of Haverhill Fever unassociated with rat-bite [see *Bull. of Hyg.*, 1935, Vol. 10, p. 251] in which 86 cases occurred and the infection was traced to unpasteurized milk, shows the many points of gross resemblance between this disease and Sodoku, and it is impossible at the present time to draw any sharp lines of differentiation by means of clinical observations alone.

Three cases of rat-bite fever, from each of which *Streptobacillus moniliformis* was recovered by special culture media and technique, are described in detail. Repeated dark field examination of the inoculated animals failed to reveal *Spirillum minus* and in each of the cases the serum agglutinated the Streptobacillus in high titres (up to 1 : 5120). Five additional cases are also described in which *S. minus* was absent, but Streptobacillus agglutinins were present. The specificity and value of this agglutination reaction has been confirmed by testing 120 normal human sera and also the sera of mice and guineapigs infected with *S. minus*. Each of the 3 strains of Streptobacillus isolated showed marked virulence for mice, the type of infection depending mainly on the generation of culture used and the particular strain of mice inoculated. Arthritis was a striking feature of chronic infections. A gold preparation (sodium aurothiomalate) was found to protect mice against the infection, whereas sulphonamide drugs had no protective action.

The authors' evidence suggests that Streptobacillus infection is induced with much greater frequency by the bite of a rat than is infection with *S. minus*. *E. Hindle.*

ROGLIANO (A. G.). **Two Cases of Rat-Bite Fever.** *Surgery*. 1942. Apr. Vol. 11. No. 4. pp. 632–635. With 3 figs.

A description of two typical cases of rat-bite fever in children treated at Grasslands Hospital, New York. In one patient spirilla were found in the blood at the height of a febrile attack, and in the other patient mice were infected by blood inoculation. The intravenous administration of neoarsphenamine was followed by recovery in both cases.

E. Hindle.

YAWS.

VARGAS CUÉLLAR (Pedro I.). El pian en la geopatologia en la Costa del Valle del Cauca. [**Yaws on the Coast of the Cauca Valley.**]—*Rev. de Higiene.* Bogota. 1941. Mar. Vol. 22. No. 3. pp. 1–79. With 4 maps & 25 figs. [Bibliography.]

The Department of the Cauca Valley is a part of the Republic of Colombia bounded on the north by the Calima river and on the south by the Rio Naya. This work is a thesis giving an account of the hydrography, geology and the flora and fauna of the department, the population, and a dissertation on the characters and prevalence of yaws there. The author tells of the races affected, the sex and age, clothing, customs, etc., the meteorology, and nature of the food, and discusses insect transmission by Ornithodorus, *Aëdes aegypti*, Musca, *Hippelates pallipes* and other species ; staining of the spirochaete ; the symptomatology, pathological anatomy and treatment. The thesis is illustrated by accounts of 24 cases and photographs of the lesions [the latter are poorly reproduced, and some convey but little information. The thesis as a whole shows that the author has undertaken a serious piece of work and carried it out conscientiously]. *H. Harold Scott.*

GONZALO GUERRA. El pian en el Litoral Pacífico Colombiano. Como debe orientarse su campaña ? [**Yaws in the Coast Area of Colombia.**]—*Med. y Cirugia.* Bogota. 1940. Dec. Vol. 5. No. 4. pp. 155–156, 158–160.

LEPROSY.

FAGET (G. H.). **Pitfalls in Early Diagnosis of Leprosy.**—*New Orleans Med. & Surg. Jl.* 1942. Mar. Vol. 94. No. 9. pp. 432–440. With 1 chart.

The author records his experience in the Carville leprosarium in the U.S.A., where, in ten Southern States, there appears to have been a slight increase in leprosy. One thousand cases are thought by some still to be free in the States. Early diagnosis is important, for the average patients admitted to Carville are fairly well-advanced, and many of them have been treated for months or years before correct diagnosis. This is largely due to lack of proper technique in examining cases for lepra bacilli. He discusses the diagnosis from syphilis, rheumatism, neuritis, sinusitis, tuberculosis and other diseases, and records illustrative cases. He finally pleads for the family physicians to think more of the possibility of leprosy in the endemic areas of the U.S.A. *L. Rogers.*

DAVEY (T. F.). **Masked Lepromatous Leprosy. A Clinical Note.**—*Leprosy Review.* 1942. Jan.–Mar. Vol. 13. No. 1. pp. 3–5.

This is a report of an instructive case illustrating how easy it is to overlook an infectious case of lepromatous disease when the typical symptoms, such as thickening of the ears, face and body, are absent. On stripping the subject the skin over the groins, lower abdomen and

genitals was seen to be several shades darker than elsewhere, and below this area ill-defined pale macules coalescing with each other fused with the pale skin of the lower extremities and the rest of the body, making him resemble a pale-skinned person. Yet a bacteriological examination revealed numerous acid-fast bacilli in the skin of the body, the nose and the ears. *L. Rogers.*

MOISER (B.). **Potassium Iodide as a Provocation Test in Leprosy. Experience of 244 Cases at Ngomahuru Leprosy Hospital, Southern Rhodesia.**—*Leprosy Review.* 1942. Jan.–Mar. Vol. 13. No. 1. pp. 6–7.

The author reports on a study of Muir's potassium iodide test in 244 leprosy cases in the course of two years. The drug was given once a week in the following doses: 5, 10, 20, 40, 80, 160, 240, 320 and 320 grains, in a pint or more of water, the test lasting nine weeks. In 196 cases no ill effects were observed, in 25 skin reactions only occurred, in 4 there was a rise of temperature, and in 19 there were both skin reactions and pyrexia. One patient died suddenly after 40 grains, but post mortem examination was not performed. If reactions occurred the test was repeated after one to three months, and second or third tests were required in 23 cases. Of the total, 135 patients have been discharged and 85 are still under observation but not under treatment, 34 of whom are still positive. Of these 34 positive cases, 25 passed the test, which in them was unreliable. It should only be used in patients in good physical condition and, in spite of some unreliability, is considered to be of value as a guide to discharge of cases. *L. Rogers.*

DHARMENDRA & LOWE (John). **Studies of the Lepromin Test. 6. Results of the Mitsuda Test in Cases of Leprosy of Different Clinical Types.**—*Leprosy in India.* 1942. Jan. Vol. 14. No. 1. pp. 3–19. [12 refs.]

This paper deals with the clinical results of the Mitsuda lepromin test in 660 cases in which the patients attended regularly for readings taken weekly till the sixth week. The result was classed as negative when the reaction was nil or if there was only slight induration up to 3 mm. in diameter without the formation of any nodule. A definite nodule at the site of the inoculation of lepromin, from 3 to 4½ mm. in diameter, was considered to be a weak positive result. Three grades of definitely positive reactions were recognized in which the diameter of the nodule was respectively 5 to 7½ mm., 8 to 10 mm. and over 10 mm., and often accompanied by ulceration. The following table summarizes the results in a convenient form :—

Clinical description of the cases	Total Number	Negative	Weak Positive	Positive
		Percent.	Percent.	Percent.
Lepromatous	141	90	10	0
N ? L, Classification doubtful ...	51	60	32	8
Neural 'simple'	112	22	35	43
Neural 'anaesthetic'	33	9	18	73
Neural 'tuberculoid'	323	6	19	75

The lepromatous cases included 16 atypical cases with weak positive reactions in five; this left only 7 per cent. of the typical lepromatous ones giving a weakly positive reaction. The neuro-macular cases of the Cairo classification were subdivided into:—simple with 44 per cent.; tuberculoid (not major) with 73 per cent.; and major tuberculoid 84 per cent., positive, so that plus reactions increase with the amount of activity as demonstrated by thickening of the lesions. Among the "simple" cases positive results were higher in the inactive arrested cases than in the active cases. In tuberculoid cases there was a higher proportion of positive results than in simple neural cases, and a higher rate in the inactive than in active cases. The presence of leprosy bacilli in the lesions is associated with a higher incidence of negative and weakly positive reactions than in the bacteriologically negative cases. Thus in all types of leprosy the lepromin test is of some value in prognosis. The season of the year may have some influence on reactions; the authors propose to deal with this subject in a later paper. *L. Rogers.*

LOWE (J.). **Leprosy and Blood-Groups.**—*Leprosy in India.* 1942. Jan. Vol. 14. No. 1. pp. 23–25.

This short note deals with the value or otherwise of blood-groups as evidence of familial predisposition to leprosy infection, a theory which has received some indirect support during recent years. After references to earlier work, a study of blood-groups in 200 typical neural and 200 typical lepromatous cases is recorded, and the percentages in each group and in the total cases in blood-groups O, A, B and AB is tabulated. The figures have been analysed statistically and no significant difference was found (*a*) between the cases of leprosy and the control group, and (*b*) between the neural and lepromatous cases. This result is in agreement with the study by HASEGAWA of 1,400 Japanese leprosy cases and contrary to the assertion of PALDROCK that persons of blood-groups O and A may be predisposed to leprosy. *L. Rogers.*

CHATTERJEE (K. R.). **Notes on the Treatment of Leprosy with Diphtheria-Formol-Toxoid.**—*Leprosy in India.* 1942. Jan. Vol. 14. No. 1. pp. 20–22.

The author reports a trial of this treatment in eight lepromatous and two neural cases of leprosy. In two of the first group some improvement in clinical condition was at first noted, but this was not maintained. In three cases each injection was followed by bursting of nodules which healed later, but in two of them new lesions also appeared. At the end of the treatment none of them was better and some were worse. Neither of the neural cases showed any improvement, one of them, in fact, developed diffuse lepromatous infiltration. Nor was any improvement in the bacteriological condition of any patient observed. Most of the patients complained of weakness, and in two cases severe eye complications developed. The sedimentation index showed no definite changes. The author concludes that no case showed any definite and lasting improvement and some were worse. He is therefore unable to confirm the claims of the Siam workers who introduced this treatment. [See also this *Bulletin*, 1941, Vol. 38, pp. 26, 704; 1942, Vol. 39, pp. 231, 232, 462.] *L. Rogers.*

FAGET (G. H.) & JOHANSEN (F. A.). **Diphtheria Toxoid Treatment of Leprosy. A Preliminary Report.**—*Public Health Rep.* 1942. Feb. 20. Vol. 57. No. 8. pp. 249–253.

The authors report on preliminary trials at Carville, U.S.A., of the diphtheria toxoid treatment advocated by COLLIER. Of 11 [? 12] patients who had persisted with the treatment up to the date of the report, one (Ll) is slightly improved, three are in a stationary state, and eight are in a worse condition that at the start of the experiment. A table shows that in 71 other patients the results in the control group of 35 were better than those of the group of 36 given toxoid. This failure is in accordance with all recent reports. *L. Rogers.*

PEREIRA (O. de Loiola). **Vaccinotherapy in Leprosy.**—*Med. Bull.* Bombay. 1942. Jan. 17. Vol. 10. No. 2. pp. 45–49. [14 refs.]

The author gives brief notes of 11 cases illustrating the use of vaccines with a view to producing immunity from infection. After reference to some of the previous literature he states that he used the Vaudremer vaccine prepared by Sezary, Levy and Bolgert from cultures, in Aspergillus medium, of fragments taken aseptically from lepra nodules, and sterilized by iodine. He claims beneficial results, but his cases are not very striking and require confirmation. *L. Rogers.*

PANDYA (B. C.), NARGUND (K. S.) & BOKIL (K. V.). **Syntheses of Anti-Leprosy Drugs, Part I—a New Synthesis of ω-Cyclo-Hexyl Undecylic Acid, an Analogue of Dihydrohydnocarpic Acid.**—*Jl. Univ. Bombay.* 1942. Mar. Vol. 10. Pt. 5. pp. 114–117.

BOKIL (K. V.) & NARGUND (K. S.). **Syntheses in the Chaulmoogric Acid Series, Part IV—Synthesis of dl-Δ^2-Cyclopentene-β-Propionic Acid—a New Homologue of Chaulmoogric Acid.**—*Jl. Univ. Bombay.* 1942. Mar. Vol. 10. Pt. 5. pp. 118–122.

HELMINTHIASIS.

SENRA (Juvenal de Mello). Sobre a pesquisa de ovos de vermes pelo método de Hoffman, Pons e Janer, modificado. [**Search for the Eggs of Worms by a Modification of the Method of Hoffmann, Pons and Janer.**]—*Brasil-Medico.* 1942. Mar. 7. Vol. 56. No. 10. pp. 107–108.

The faeces of 100 children were examined and the results will be published later; here the method is described. The author was seeking the eggs of *Schistosoma mansoni* but wished to devise a method suitable for the eggs of all the commoner parasites and for the faeces encountered in his district, which often contain alkaline earths, especially calcium, tinged with bilirubin; these make faecal examination difficult.

Fülleborn's method and the method of Hoffmann, Pons and Janer are both good for finding the eggs of *S. mansoni*. Fülleborn emulsifies a small quantity of faeces in 2·5 per cent. solution of NaCl, leaves it to sediment and adds warm distilled water to the sediment, when, in

a strong light, the miracidia can be seen with a lens after their escape from the eggs. Hoffmann, Pons and Janer take 2 gm. of faeces in 10 cc. of water, leave it for 10–20 minutes to break up, stir and add 20 cc. of water. The emulsion is then put through a metal screen of 80–100 meshes per sq. cm. and collected into a conical urine glass to sediment. After decanting the supernatant fluid, 50 cmm. of the sediment are taken up with a graduated pipette and examined on a slide with a cover glass and high power of the microscope.

Senra's modifications are: (1) to take more faeces (3–4 gm.) to increase the chances of finding eggs in light infestations; (2) to re-emulsify the sediment in the urine glass in water, stirring it well; (3) to sediment again for 5–30 minutes and decant the supernatant fluid; he examines only 4–5 drops of the sediment (0·3–0·4 cc.) on a slide without a cover glass; (4) he does not use a pipette, but vigorously shakes the urine glass with a circular motion after decanting the supernatant fluid, and pours the drops to be examined on to the slide, spreading them with a match or a toothpick. He claims that this method is better with faeces containing bilirubinates, because these deposit first and the schistosome eggs are most numerous in the layer just above the "intestinal sand," though some are mixed with it; for this reason pouring off the drops to be examined is better than the use of a pipette. Further, a low magnification of the microscope or a lens are sufficient for the examination. More transparent preparations are obtained and the method can be used as a routine. *G. Lapage.*

GELFAND (Michael). **The Diagnosis of Bilharziasis in Southern Rhodesia.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1942. Mar. 6. Vol. 35. No. 5. pp. 281–288.

"Bilharziasis is a chronic inflammatory disease. The symptoms and signs may therefore be general or constitutional such as fever, loss of weight, lassitude, an increased blood sedimentation rate, or a blood eosinophilia.

"Involvement of certain organs such as the liver and spleen, appendix, Fallopian tubes, testis and especially the bladder and bowel should always make one consider the possibility of bilharziasis in this territory."

Among the cited cases the following features were noted: loss of weight, periodic haematuria, no ova in urine, lesions evident on cystoscopy, permanent relief after antimony treatment. Dysentery, in which amoebae were never found in the stool, nor were ova of *S. mansoni* while the stool consisted of blood and mucus only, but when this attack passed off many ova were present in the faeces. Constipation, loss of weight, easy fatigue, no ova in urine or faeces but an eosinophilia of 13 per cent.; re-examination of both excreta resulted in ova of *S. mansoni* being found in faeces; after intravenous antimony lassitude disappeared and the patients put on weight. A girl of 27 working on infected snails began to lose weight, eosinophilia rose, no ova were found in urine or faeces (it probably being too early for them); she was given antimony with dramatic result. A native laboratory boy had epigastric pains after food, lost much weight; ova of *S. haematobium* were found in the urine, and he recovered after treatment. An army sergeant supposedly malingering or neurotic had lost appetite, weight and energy, and became rather thin; the spleen was enlarged, there was no eosinophilia, the blood sedimentation rate was rather raised to 7·5 per cent., ova of *S. mansoni* were found in the stool,

and his health improved considerably after antimony. As pendents to the last are, first a boy of 12, a great swimmer, eosinophils 3 per cent., B.S.R. 10·3 per cent., ova of *S. haematobium* in urine; second a man of 23, B.S.R. 1 per cent., eosinophils 17 per cent., only after repeated examinations were ova of *S. mansoni* found in the stool. Lastly a native boy of 14, with loss of weight and general pains, swinging temperature, enlarged spleen, no malaria parasites; quinine was useless, urine and stools contained schistosome ova, and after hesitation he was given antimony; his temperature settled and health improved.

Clayton Lane.

SOUZA LIMA (Jacinto Soares). Alguns aspectos da esquistosomose em Minas. [**Schistosomiasis in Minas Geraes.**]—*Folha Med.* 1941. Mar. 5. Vol. 22. No. 5. pp. 52–55.

The author gives a general text-book account of the forms of Schistosoma which occur and especially of those known to infect man—*S. haematobium, S. mansoni* and *S. japonicum.* He then quotes from laboratory and other reports to point out that in some parts of Minas Geraes the incidence [*i.e.*, the findings from examination of stools for ova] ranges from under 1 to as high as 11 per cent., the average being about 6 per cent. He calls on the health authorities to take steps to deal with the problem.

H. Harold Scott.

VOGEL (Hans). Ueber Entwicklung, Lebensdauer und Tod der Eier von Bilharzia japonica im Wirtsgewebe. [**On the Development, Length of Life and Death of the Eggs of** *Bilharzia japonica* **in the Tissues of the Host.**]—*Deut. Trop. Ztschr.* 1942. Feb. 1 & 15. Vol. 46. Nos. 3 & 4. pp. 57–69; 81–91. With 5 figs. [10 refs.]

In the first part of this paper Vogel describes eight types of eggs of *S. japonicum* seen in crush preparations of fresh tissues of the intestinal wall of mice, rabbits, guineapigs, dogs and monkeys artificially infested with this parasite. The wall of the mouse's intestine is especially suitable for this work because it is very thin; from the intestinal walls of the larger animals the mucosa and submucosa were scraped off with the edge of a slide and thin layers of the mush so obtained were examined. Attention was concentrated on the main developmental features, the time required for the development of the miracidium and the changes in the egg after its death in the host's tissues. Good illustrations are given of the following eight types of eggs seen:—

1. The new laid egg, which is quite different from the eggs in the uterus—in the latter the yolk cells are relatively small and compact and do not fill the egg space; in the former a vacuole 14–23 microns in diameter appears in each yolk cell, expanding it so that the yolk cells fill the egg space. Yolk granules lie on the edges of these vacuoles and between them. The crowding of the egg with vacuoles renders it less transparent. Stained preparations show that the egg nucleus has divided into two nuclei rather unequal in size. These "mulberry" stages of the egg also appear in liver tissue. New-laid eggs are found in the lumina of the smaller vessels, usually in chains. They measure 67×46 microns (the uterine egg measures 65×50 microns). The mulberry stage lasts only about one day.

2. Eggs with an immature embryo.—This stage includes most of the development and lasts much longer than stage 1. Four stages in development can be made out: (*a*) The vacuoles of the mulberry stage have gone and the yolk granules are uniformly distributed in the yolk cells, among which is the transparent embryo, composed of a few cells. These eggs measure 65×43 microns. (*b*) Rather smaller eggs, measuring 63×41 microns, containing a rounded transparent embryo occupying almost the whole of the egg and contrasting with the dark yolk granules, most of which have disappeared. (*c*) Rather bigger eggs containing oval transparent embryos which almost fill the eggs; rudiments of the organs are still not visible in fresh preparations. (*d*) Eggs measuring 77×57 microns, containing miracidia almost mature. The tapering anterior end is now seen for the first time. Cilia can also be seen with difficulty, and the head glands, intestine, ganglion and terminal cells of the excretory system are more or less visible.

3. Eggs with mature miracidia.—The maximum size of 84×65 microns has been reached. The regular oval of the embryo has given place to an irregularly indented body with a pointed anterior end. Its cilia, head glands, intestine, nervous system and excretory canals are well seen and it shows jerky movements.

4. Eggs with disturbed development.—These are the same size as those of stage 3 and are rare. They show a small embryo in a disproportionately large egg space. The yolk collects at the egg poles, the embryos are dead and may show signs of degeneration. In rabbits, mice, dogs and monkeys such eggs amount to 1–2 per cent. or less of all the tissue eggs, but in guineapigs and hamsters they are much more numerous. Vogel reminds us that development is not completed in the hamster, so that the relatively large number of these eggs is easily understood.

5. Eggs containing miracidia that have recently died.—At first only slight changes occur in such miracidia. The larval area is only slightly turbid, but the surest sign of death is the cessation of ciliary action. Later, irregular clumps of cells are seen, which break up into granules. Nishi described this stage as granular degeneration. The larva may now acquire a brownish tint.

6. Calcified eggs, measuring 70×51 microns, calcification having led to some shrinkage.—Such eggs are strongly refractile in fresh preparations; if the calcification centre is homogeneous, they are colourless or yellowish; if it is folded they look dark or almost black. They stain intense black with silver nitrate. The calcareous matter can be expelled by pressure with radial splitting of the egg shell.

7. Granular eggs, measuring 68×52 microns, full of fine or coarse, strongly refractile fatty granules soluble in xylol and staining with Sudan III.—The shell may be deformed. These were formerly described by some Japanese workers as new-laid eggs. Vogel thinks they are unfertilized or have for other reasons failed to develop.

8. Empty shells or shells filled by host cells.—The shell is usually irregularly folded or split open.

Counts on the eggs in the intestinal tissues of rabbits with infestations about 2–3 months old showed that eggs with immature embryos were most numerous and that most of the dead eggs were of the granular type. The percentage of calcified eggs was small, probably because the infestation had not lasted long enough; in other rabbits killed 7 months after infestation 60·5 per cent. of the eggs were calcified.

Counts of the eggs in the liver were made difficult by the density of the liver tissue. Thin razor sections of this were better than frozen sections. More calcified eggs were found in the liver, probably because there is no natural outlet from this organ [see length of life of miracidia below].

To determine the time needed for the development of the miracidia Vogel infected white mice and killed them at intervals during the succeeding 18–37 days. He concludes that eggs passed on the 25th day after infestation and most of those passed on the 26th day are not fertilized. The possibility of fertilization was determined by examining the worms for sperms in the male and for sperms and eggs in the uteri of the female. The first fertilized eggs were passed on the 26th and 27th days after infestation. The first mature miracidia appeared on the 36th day, being very rare then, so that the miracidia needed 9–10 days for their development. This was confirmed by experiments, described in the second part of Vogel's article, on mice treated with tartar emetic.

In the second part Vogel discusses his work on the length of life of the eggs in the tissues. Large numbers of eggs die a natural death or are killed by the host's reactions. Vogel and Minning treated rabbits infested with *S. japonicum* with intravenous tartar emetic and found new-laid eggs still in the intestinal wall seven days after the beginning of treatment, but none on the ninth day and afterwards. The treatment had thus stopped egg-laying on the seventh, eighth and ninth days. On the 16th day after treatment began, eggs with immature embryos could still be found, but from the 19th day onwards none could be found. This meant that the miracidia of the last eggs to be laid (those laid on the seventh or eighth days) were mature on the 17th, 18th and 19th days, so that 9–12 days were needed for the development of the miracidia, a time which corresponds with that determined by the observations on the eggs in fresh tissues described in Vogel's first article.

Eggs with mature miracidia were seen for the last time in the gut tissues on the 29th day after treatment began. On this day, in two other rabbits and in other animals, such eggs could not be found. The maximum life of the eggs was thus 21–22 days from laying to death. Was this normal or due to the action of the antimony?

To answer this question Vogel used the fact that the right lobe of the rabbit's liver has a separate branch of the portal vein. If this is ligatured, there is no other communication between the portal system of the right lobe and that of the rest of the liver. Ligature makes it possible to stop the entry of schistosome eggs from a certain time onwards, so that the length of life of eggs admitted to this lobe can be estimated. The operation for ligature of the branch of the portal vein to the right lobe while leaving intact the artery and bile ducts of this lobe is described. If this is done there is no risk of disturbing the nutrition of the eggs, because nothing more happens than atrophy of the liver parenchyma. Seven rabbits were each given 200–250 cercariae of *S. japonica* and the success of the infestation was determined by faecal examination. The portal vein to the right lobe of the liver was ligatured 87–180 days after infestation and the livers were sectioned at 7, 16 and 20–23 days after ligature. No worms or cercariae were recovered from the right lobe of the liver, although they were obtained from the gut and rest of the liver. At seven days after ligature the right lobe showed none of the youngest egg stages described above, no new laid eggs and no eggs with immature embryos, but numerous eggs

at stages 2*c* and 2*d* and eggs with mature miracidia. At 16 days after ligature there were only eggs with living mature miracidia ; at 20 days these were rare, but degeneration was beginning in the miracidia of most of them, although cilia could still be seen. At 21 days only dead eggs were found, but two miracidia were recovered. At 22 and 23 days there were no living eggs and no miracidia could be recovered. The maximum life of the eggs was therefore 21 days [*cf.* the 21–22 days determined by the work with rabbits treated with antimony]. The development of the egg takes 9–10 days, so that the mature miracidia live only the strikingly short time of 11–12 days. During this time the eggs must get into the gut lumen, so that it is possible that only eggs that lie near the inner surface of the gut lumen get into it.

G. Lapage.

BERGE (Ch.), AUDOYÉ (H.), FAUCONNIER (J.) & BERRE (L.). Un cas tunisien d'infestation par la grande douve du foie (*Fasciola hepatica*). [**A Tunisian Case of Infestation by the Large Liver Fluke** (*Fasciola hepatica*).]—*Arch. Inst. Pasteur de Tunis.* 1940. Dec. Vol. 29. No. 4. pp. 466–470.

The authors describe the first published case of infestation of the liver of man in Tunis. Only 130 cases are known in the world and only eight cases in Algeria. They think it may not be exceptional in Tunis, because the parasite is so common in sheep and oxen there and is acquired by eating watercress and other uncooked food contaminated by the cercariae. Diagnosis depends on finding the eggs of the parasite, because the clinical picture is vague and not characteristic.

Their patient was an army cook aged 26 with a history of periodical epigastric painful crises without vomiting, sometimes lasting several hours ; he had been in hospital earlier in the year with a diagnosis of cholecystitis and then had passed a Taenia ; the previous year he had had malaria (*P. vivax*) and had been treated with quinine and sodium cacodylate ; in the same year his condition had been diagnosed as dysentery with glairy stools containing blood, but no amoebae, amoebic cysts or parasitic eggs had been found. When admitted he said he had often eaten watercress bought in the Bizerta market. He had lost 7 kgm. in six months ; examination revealed little except a slightly enlarged liver with a palpable lower border, pain on palpation over the solar plexus, a palpable spleen and an eosinophilia of 20–34 per cent. There was no anaemia, icterus or fever, and no parasitic eggs were found in the faeces. Duodenal intubation, however, revealed eggs of *Fasciola hepatica* in the bile. Treatment with emetine injections and 914 by the method of Ravaut failed to remove the flukes, their eggs being even more numerous when duodenal intubation was repeated at the end of the treatment (after about two months). The patient had then to be sent to another hospital for military reasons. The eosinophilia varied from 66–50 per cent. when he was discharged.

The authors single out as the dominant signs the eosinophilia accompanied by colic without fever, and the loss of weight without anaemia ; they think the prognosis is grave ; cachexia and death may follow. Duodenal intubation may reveal other cases in Tunis, and the consumption of watercress of unknown origin is not wise.

G. Lapage.

MAZZOTTI (Luis) & OSORIO (M. Teresa). Sobre la presencia de huevecillos de *Fasciola hepatica* en los extractos biliares medicinales. Su significación en el diagnóstico coprológico. [**Eggs of *F. hepatica* in Medicinal Ox Bile.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1941. Dec. Vol. 2. No. 3–4. pp. 355–361. With 1 fig. English summary.

"It has been stated that persons having ingested liver or biliary extracts derived from parasitized animals, may show *Fasciola hepatica* eggs in their stools.

"As this source of error appears to have occurred exceptionally in Mexico, an examination was made of 30 samples of ox gall extract from different drug-stores of the city of Mexico. In 10 of the samples *F. hepatica* eggs were present.

"Information was obtained that the samples of extract which presented eggs had been obtained by the drug stores from European, North American and Mexican laboratories. The number of eggs present in the extracts appeared to be low.

"Several patients were experimentally given ox gall extract in overdoses but it was possible to find several eggs in the excreta of them only when an extract specially made with ox gall from very parasitized cattle was used."

SALDUN DE RODRIGUEZ (M. L.), SOTO (J. A.) & GIAMPIETRO (J.). Cisticercosis cerebral y muscular. [**Cerebral and Muscular Cysticercosis.**]—*Archivos de Pediatria d. Uruguay.* 1941. Sept. Vol. 12. No. 9. pp. 549–567. With 3 figs. [20 refs.]

The authors discuss the geographical distribution of cysticercosis, its age-incidence, aetiology, pathology, symptoms, clinical manifestation, differential diagnosis by modern methods, prognosis and treatment and the life cycle of *Taenia solium* and the structure of its various stages in the tissues. Remarking that it is a disease of adults and that they have found in the literature the record of only one case in a child, the historic case recorded by AUSTONI, they describe one case of their own, in a Spanish child aged 14, who belonged to a family which had the care of pigs and ate large quantities of cooked and uncooked pig meat; an uncle had a Taenia and the girl herself had various unspecified intestinal parasites. At the age of 11½ she had attacks of an epileptic type, at first incomplete and of short duration and later more intense, with every character of epilepsy. Clinical and laboratory examinations failed to show any abnormality, but radiography of the head showed numerous calcified nodules inside the brain, which were diagnosed as calcified cysticerci. Radiography also revealed similar nodules in the upper third of the legs. The family and the patient objected to biopsy, so that this could not be done. Treatment with arsenicals gave no result.

Human cysticercosis is almost unknown in Uruguay, only two cases being known in adults, one having been diagnosed at autopsy and the other by radiography. Their case is the first to be described in a child in Uruguay; no others have been found in South American literature. In European literature they have found only the case described by Austoni in a girl aged 10, in whom biopsy revealed cysticerci; this patient died and autopsy confirmed the diagnosis and *Taenia solium* was found in the intestine; she had had headaches for 10 years, with

vomiting, muscular pains and a cerebellar syndrome. In the authors' case the epileptic syndrome was the only manifestation and diagnosis was possible only by radiography; radiograms are given of the head and legs. *G. Lapage.*

BRAILSFORD (James F.). **Unrecognized Cysticercosis.**—*Lancet.* 1942. Jan. 24. pp. 127–128.

The author's distinctive views are set out in his summary.

"Radiography permits of the diagnosis of cysticercosis when the parasites have degenerated and calcified, but affords no help in the earlier years of infestation. Writers in recent years have focused undue attention on the effects of the dead parasite, even to the point of advising against any treatment likely to kill it. Actually, it is rare to obtain radiographic evidence of cysticerci in the brain in patients with symptoms of central nervous disease. The more important symptoms occur at the time of infestation and during the development of the parasite, and these are misinterpreted. In later years, when symptoms have as a rule ceased, radiography for other reasons may reveal the calcified parasites.

"Attention to the early diagnosis and treatment offers a hopeful outlook. By simple preventive measures the disease could be eradicated."

GRANA (Alfonso) & SCHENONE (Br. Héctor). Eosinofilia del liquido cefalo-raquideo por cisticercosis cerebral. **Eosinophilia of the Cerebro-Spinal Fluid due to Cerebral Cysticercosis.**—*Arch. Uruguayos de Med., Cirug. y Especialidades.* 1941. Aug. Vol. 19. No. 2. pp. 135–145. With 4 figs. on 2 plates. [19 refs.]

The authors review the literature on cysticercosis in man and discuss the diagnosis. They record details of one case, a boy 18 years old, with a history of headaches, photophobia and fever. Three features of the cerebrospinal fluid are emphasized: (1) it was not clear; (2) it showed a high eosinophilia of 32 per cent. Eosinophilia of the cerebrospinal fluid has been recorded by Demme, by Merrito and Freeman and by Risso, who regards it as pathognomonic of cerebral cysticercosis. In the authors' case the eosinophilia decreased until, at the last examination a month after the beginning of the illness, it had reached 10 per cent., when the patient was apparently returning to health. On the other hand, Dolgopol states that the fall of the eosinophilia of the cerebrospinal fluid is accompanied by an aggravation of the illness; (3) it contained an excess of glucose, although the blood sugar was normal. The possible significance of this is discussed.

Examination of the eye revealed the presence of a protruding body in the left retina which was not diagnosed by eye specialists. Radiography failed to reveal calcified cysticerci in the muscles. Casoni's intradermal reaction was negative, but Talice's intradermal reaction with cysticercal fluid was so positive that the diagnosis was certain. Irregularities in the large third ventricle, which is the site of election of cysticerci, and a similar irregularity in the right occipital horn resembled localized cysticerci.

The authors emphasize the fact that the red blood cell count was 7 million. They think this was due to the localization of the cysticerci in the region of the hypothalamus; they compare this fact and the leucocytosis, fever and somnolence shown by their patient with similar symptoms recorded by Laruelle in a case of cystic tumour of the third ventricle. *G. Lapage.*

GAUPP (H.). Die Gehirnzystizerkose. [**Cerebral Cysticercosis.**]—*Deut. Med. Woch.* 1941. Nov. 21. Vol. 67. No. 47. pp. 1289–1292. With 3 figs. & 4 charts.

FERRACANI (Remo S.). Obstrucción intestinal por ovillo de *Taenia saginata.* [**Intestinal Obstruction by** *Taenia saginata.*]—*Rev. Méd.-Quirúrg. de Patol. Femenina.* Buenos Aires. 1941. Oct. Vol. 18. No. 4. pp. 317–319. With 1 fig.

A woman of 62 years who was known to be harbouring a *Taenia saginata* had suffered a year previously from obstruction which, however, passed off spontaneously. On the present occasion she felt one morning a dull pain in the right hypochondrium ; after breakfast this became more acute and was accompanied by vomiting which later became bilious, then faeculent, in fact the signs of acute obstruction were evident. At operation, a bunched up mass of a *T. saginata* was found in the small intestine 32 inches above the ileo-caecal valve. Its removal resulted in cure and convalescence was uneventful.

H. Harold Scott.

AGUILAR (Francisco J.). Parásitos que existen en Guatemala. La Tenia Equinococo en estado lavario infesta en considerable proporción al cerdo. Es muy probable que existan casos humanos. [**Parasitism in Guatemala. Ecchinococcus Infestation of Pigs.**]—*Guatemala Méd.* 1941. Nov. Vol. 6. No. 11. pp. 4–5. With 2 figs.

The author has found hydatid infestation in a considerable proportion of pigs slaughtered. Among 190,431 killed in five years 4,033 showed the cysts, *i.e.* 2·1 per cent., but the proportion varied from year to year ; in 1938 it was only 0·22, whereas in 1940 it was 1·38, and in 1936 as high as 6·12 per cent. Sheep and goats rarely harboured the cysts. The liver was the commonest site, the kidneys next, and, fewer, in the spleen and mesentery. The author states that there are possibly human cases also. [This is quite possible, but no facts are given in support of the suggestion and the heavy infection of the pigs is ascribed to this animal's coprophagous habits.] *H. Harold Scott.*

SALGAR (Abraham Afanador). El primer caso de quiste hidatico en Colombia. [**The First Case of Hydatid Cyst Reported in Colombia.**]—*Rev. Facul. de Med.* Bogota. 1941. Oct. Vol. 10. No. 4. pp. 325–338. With 12 figs. on 4 plates.

ARCE (José). **Hydatid Disease (Hydatidosis). Hydatid Cyst of the Lung.** *Arch. Surgery.* 1941. Nov. Vol. 43. No. 5. pp. 789–802. With 4 figs.

RIVAS (Carlos I.) & GÓBICH (Emilio). Equinococosis hidatídica del pulmón. El signo del doble arco, de Ivanissevich. [**Hydatid Cyst of the Lung ; Ivanissevich's Sign.**] *Bol. Inst. Clín. Quirúrg.* Buenos Aires. 1941. Oct.-Dec. Vol. 17. No. 143. pp. 1230–1237. With 8 figs.

MOREL (Clemente J. L.). Quistes hidatídicos del bazo. [**Hydatid Cysts of the Spleen.**]—*Bol. Inst. Clín. Quirúrg.* Buenos Aires. 1941. Oct.-Dec. Vol. 17. No. 143. pp. 698–884. With 131 figs. [Bibliography.]

AGUIAR (José Adonias). Nephrose lipoidica ankylostomosica. [**Fatty Nephrosis due to Hookworm Infection.**]—*Brasil-Medico.* 1940. Mar. 2. Vol. 54. No. 9. pp. 129–135. With 2 figs. [11 refs.]

Aguiar discusses the aetiology of fatty nephrosis in cases of ankylostomiasis. BERARDINELLI thought that ankylostomiasis may cause fatty nephrosis, a view which Aguiar thinks is supported only by clinical reasoning and lacks experimental proof; it would be proven if removal of the hookworms resulted in disappearance of the fatty nephrosis. He gives a detailed history of one case described in the classes of Professor TAVARES in 1939, in which this happened. The patient, a man of 20 years, had numerous eggs of *Ancylostoma duodenale* in the faeces and some eggs of *Ascaris lumbricoides* and *Trichuris trichiura*. Oil of chenopodium reduced the number of ancylostome eggs till, 18 days after treatment, they were very rare. Later the fatty nephrosis disappeared. The patient had malaria as well, but this was not considered to be responsible for the clinical picture, because malarial treatment before admission to hospital intensified the syndrome. The various questions arising out of Berardinelli's views are discussed. *G. Lapage.*

VILLEGAS (N.). **Edema and Cachexia from Ascaridiasis.**—*Bol. Clínico.* Medellín. 1941. Oct. Vol. 7. p. 483. [Summary taken from *Jl. Amer. Med. Assoc.* 1942. June 13. Vol. 119. No. 7. p. 597.]

Villegas describes a type of cachexia in nonsyphilitic children with ascaridiasis which is characterized by excessive coldness of the extremities, bleeding gums, pellagroid mucosal and buccal lesions, dermatitis, anasarca, vomiting, diarrhea or constipation, meteorism, loss of appetite, hypotension, muscular and psychic asthenia, somnolence and rapid progressive decline in the weight and in the general condition of the patient. It is observed in poorly nourished children of tropical and semitropical countries. Treatment with diuretics, anthelmintics, epinephrine, vitamins, tonics and hormone preparations usually fails. Mortality is 80 per cent. Good results were obtained from administration of eight drops daily of nux vomica for 10 to 15 days. The general condition improved from the first two or three days of the treatment, during which the patients eliminated a large number of ascarids and regained their appetite. After three to five days of the treatment, 13 Gm. of castor oil with four drops of volatile oil of chenopodium is given. The diet consists of milk, fruits, meat, vegetables and carbohydrates given as soon as the treatment starts. Permanent cure was obtained in all cases. Edema of the feet disappeared in the course of the treatment.

DHAYAGUDE (R. G.) & AMIN (B. M.). **Microfilarial Granulomata of the Spleen.**—*Amer. Jl. Path.* 1942. Mar. Vol. 18. No. 2. pp. 351–361. With 8 figs. on 2 plates.

Search through the records of the King Edward VII Hospital, Bombay, has revealed no mention of filarial lesions of the spleen in an area where filariasis is common. Yet these writers report on eleven spleens obtained at necropsy at this hospital, they all showed lesions readily detected by the naked eye, and these lesions contained microfilariae under the microscope.

Death was due to injuries in six of these cases ; the spleen was classed as normal in size in six, as smaller than usual in two, as enlarged in two, as little larger than normal in one. The time between admission to hospital and death lay between a few minutes and four days.

" In these spleens nodules could be felt at the surface. They were smooth and rose a little above the surface. They were a little firmer than the rest of the splenic tissue and their size varied from 2 to 25 mm. Usually they were multiple, but occasionally only a single nodule was present. On the cut surface the nodules presented a reddish or reddish brown appearance quite distinct from the chocolate colour of the splenic parenchyma. They were sharply circumscribed and occasionally two or three of them merged into one large nodule. In a preserved organ the nodules stood out on the cut surface."

They were thought to be endotheliomata, but some showed marked eosinophilia and closer investigation showed that each one contained microfilariae. A nodule is denser than the surrounding spleen and splits away from it on hardening and sectioning, while before sectioning it may be seen projecting out from the surface of the hardened spleen. Histologically the nodules showed marked local or general eosinophilia and either dilated sinuses filled with red cells or pronounced hyperplasia of reticulo-endothelial cells. In some sections giant cells were conspicuous, in some, reticular tissue was increased, usually without increase in fibrous connective tissue.

" The nodules did not contain any malpighian bodies or large-sized blood vessels. Apparently they derived their blood supply from capillaries and sinusoids. It may thus be seen that the histological structure of the lesions was that of a granuloma."

Every one of those lesions showed microfilariae [subsequently identified as *W. bancrofti*] in tissue sections, in very varying numbers and not associated with any particular histological change. In sections of other organs presence or absence of detected microfilariae was noted.

Clayton Lane.

Hu (S. M. K.). **Studies on the Susceptibility of Shanghai Mosquitoes to Experimental Infection with** *Microfilaria malayi* **Brug. V.** *Armigeres obturbans* **Walker.**—*Peking Nat. Hist. Bull.* 1941. Vol. 16. Pt. 1. pp. 55–65. With 2 plates. **VI.** *Aëdes albopictus* **Skuse.**—*Ibid.* pp. 67–70. With 1 plate. [Summary taken from *Rev. Applied Entom.* Ser. B. 1942. June. Vol. 30. Pt. 6. pp. 84–85.]

These two papers contain records of experiments, similar to others already noticed, that were carried out during 1939 and 1940 in Shanghai to test the susceptibility to infection with *Filaria* (*Microfilaria*) *malayi* of *Armigeres obturbans*, Wlk., and *Aëdes albopictus*, Skuse, respectively. Of 140 adults of *Armigeres obturbans* that had engorged on patients with light infections, only one, dissected 13 days after the feed, harboured an infective larva, 118 were negative and 21 contained dead immature larvae. Out of 25 adults of *Anopheles hyrcanus* var. *sinensis*, Wied., fed at the same time as some of the 140, 17 contained infective larvae on dissection. All the 149 adults of *Armigeres obturbans* fed on a patient with a heavy infection contained immature larvae at the time of dissection, and 11 contained infective larvae also, those in three of them being alive. Most of the immature larvae had died in the first stage and had undergone chitinous encapsulation. The greatest number of

living infective larvae found in one mosquito was 6, and the greatest total number of larvae in one mosquito was 97. When a female of *A. obturbans* and one of *Anopheles hyrcanus* var. *sinensis* were fed at the same time on a heavily infected patient and dissected 28 and 20 days later, respectively, the former was found to be harbouring two encapsulated, dead, ensheathed microfilariae in its abdomen and 13 dead, encapsulated, first-stage larvae in its thorax, of which 11 were in the sausage form and two had started to elongate towards the first ecdysis, while the latter contained 38 infective larvae. Although the susceptibility of *Armigeres obturbans* to infection is thus shown to be low, it is possible that, as it is one of the most common household mosquitoes in the lower Yangtze region, where it breeds in heavily polluted water, it may play a minor part in the transmission of infection. It comprised 1,250 out of 11,740 mosquitoes collected in a man-baited trap during 1934 in a village in the Kaochiao district, and 383 out of 1,216 taken in houses in the Woosing region in September and October 1933.

Of 180 individuals of *Aëdes albopictus* fed on lightly infected patients, two were found on dissection to contain single, dead, encapsulated immature larvae. The others were negative. Of 175 fed on a heavily infected patient, 77 were negative, while the remainder were harbouring dead first-stage larvae, most of which were encapsulated microfilarial forms in the abdomen.

OELKERS (H. A.) & ZESSLER (H.). Untersuchungen an Oxyurenlarven. [**Research on Enterobius Larvae.**]—*Klin. Woch.* 1942. Mar. 21. Vol. 21. No. 12. pp. 269–270.

Fresh Enterobius larvae remained alive *in vitro* for two or three days and showed very different sensibility to anthelmintics that have been tested against them. Usually their resistance is extraordinarily high.

For example, santonin in saturated solution is useless. Filmaron, ascaridol and pyrethrin may have no effect even when acting for long in high concentration. Certain thymol derivatives and ethereal oils have proved relatively lethal.

The effects of pepsin and trypsin, in solutions of different *p*H values, on the hatching of eggs are described. *Clayton Lane.*

SCHWARZ (J.) & STRAUB (M.). **Oxyuriasis and Appendicitis.**—*Arch. Pathology.* 1942. Jan. Vol. 33. No. 1. pp. 28–36. With 3 figs. [20 refs.]

DEFICIENCY DISEASES.

FRONTALI (G.). Neure Studien ueber Pellagra. [**New Studies in Pellagra.**]—*Schweiz. Med. Woch.* 1942. Feb. 21. Vol. 72. No. 8. pp. 208–217. With 15 figs. & 1 chart.

This is a long involved communication which does not readily lend itself to analysis. The author writes from Padua. The results may be stated as follows :—

(1) A pellagra-inducing diet can be transformed into a pellagra-healing diet by addition of nicotinic acid or its amide.

(2) The effective working of this line of treatment is observable in the rapid improvement in the skin and mucosal lesions, capillary changes, gastrointestinal syndrome, the hypochlorhydria, as well as in the many-sided nervous and psychical phenomena. The nitrogen balance is rectified and the basal metabolism increased, as evidenced by diminution of the blood porphyrin concentration and the consequent lessened excretion in the urine, and at the same time by the accelerated excretion of nicotinic acid in the urine.

(3) Human pellagra does not represent a many-sided syndrome—a kind of mosaic-deficiency disease—but a definite clinical, aetiological and pathological entity.

(4) Nicotinic-acid deficiencies are apparent in different dystrophies, especially in infantile coeliac disease and in non-tropical sprue. The metabolism of nicotinic acid is not understood and requires much further elucidation.

Capillary changes were studied by a three-fold method—by microscopic appearances, by capillary pressure, and by capillary fragility. Certain changes in the skin capillaries in pellagra erythema of the dorsum of the hand were definitely demonstrable. These are given in great detail. The capillary net in each skin papilla appeared greatly dilated, resembling small glomeruli. Sometimes they were surrounded by haemorrhagic margins.

Within 48–72 hours from the commencement of nicotinic-acid therapy a definite blanching of the general coloration could be observed.

The excellent photographic illustrations depict in no uncertain manner the classical form which pellagra assumes in these Italian children, as well as the extraordinary curative effect of nicotinic acid therapy upon the skin lesions. Photomicrographs illustrate the contour of the capillaries of the nail-bed in pellagra before and after nicotinic acid therapy. *P. Manson-Bahr.*

ALESSANDRI (H.), GARCIA PALAZUELOS (P.) & LERNER (J.). La pelagra del adulto en Santiago de Chile. (Consideraciones sobre 110 casos.) [**Pellagra in Adults in Santiago (Chile).**]—*Rev. Argentina de Dermatosifilologia.* 1942. Vol. 26. Pt. 1. pp. 25–40.

This article is rather of local than of general interest, but is useful for comparison with others though the numbers are few. The authors divide their cases into four groups: (1) Primarily nutritional, 29 cases, 14 urban, 15 rural; (2) Alcoholic, 60 cases, 44 urban, 13 rural, 3 not certain; (3) Secondary to severe organic disease, tuberculosis of the lungs, malignant disease of the intestine, and amoebiasis, 12 cases; (4) Mixed, alcoholism and organic disease coexisting, 9 cases—110 altogether. In successive decades from 20 onwards the numbers were 14, 30, 29, 24, 10 and 3. There is believed to have been an increase in the disease morbidity of late years, especially the last five years, and the number is given as now about 3,000 cases in Chile. In Santiago, alcoholic cases are twice as numerous as the endemic. The fatality rate among the 110 hospital cases has been 26 per cent. (29 deaths); of the first group three died, of the second 14, of the third and fourth each six. Of the 14 in the second group in three the pellagra is said to have played no part, two died after the pellagrous symptoms had disappeared, the other from haemorrhage secondary to cirrhosis of the liver. Three who died from the pellagra itself had had a complete

course of nicotinic acid. This drug was observed to exert spectacular improvement in psychic symptoms, even within so short a time as 48 hours. *H. Harold Scott.*

MENDOZA GONZÁLEZ (E.). **Optic Neuritis in Pellagra.**—*An. Soc. Mex. de Oftalmologia.* Mexico. 1941. July–Aug. Vol. 16. p. 189. [Summary taken from *Jl. Amer. Med. Assoc.* 1942. Mar. 14. Vol. 118. No. 11. p. 928.]

Mendoza González observed optic neuritis in 7 of a large group of pellagrous patients. This type of neuritis has not been previously reported. Three patients were alcoholic addicts. Two of these presented alterations in the central vision and photophobia. The third alcoholic addict presented a picture of optic neuritis. Two patients had amblyopia without the ophthalmologic picture of optic neuritis, and 2 had diminished visual acuity and visual reduction of the temporal fields. Proper diet and the administration of nicotinic acid effected great improvement in the pellagra symptoms. They had no effect on the visual symptoms of optic neuritis. These improved on oral and parenteral administration of thiamine hydrochloride and the use of a diet rich in vitamin B_1. The patients were also given extracts of gastric mucosa to stimulate proper absorption of vitamin B_1.

AHMED (N.). **Pellagra in the United Provinces.**—*Indian Med. Gaz.* 1942. Mar. Vol. 77. No. 3. pp. 140–145. [19 refs.]

EPIDEMIC DROPSY.

SARKAR (S. N.). **Some Observations on the Mustard Oil-Argemone Oil Theory of Epidemic Dropsy.**—*Ann. Biochem. & Experim. Med.* Calcutta. 1941. Mar. Vol. 1. No. 1. pp. 59–63. [11 refs.]

This article is a preliminary paper on the question of Argemone oil, as a contaminant of mustard oil, being the causative toxin of epidemic dropsy. The author discusses the work of LAL and ROY, CHOPRA and PASRICHA, and notes that incriminated oil collected from various localities is highly toxic whereas from Pasricha's calculations, an average amount of 14·3 oz. of Argemone oil would be necessary or from 142·6 to 237·6 oz. of mustard oil containing 10 or 6 per cent. respectively of the Argemone oil. He, therefore, thinks that the cause of the symptoms must be not the Argemone oil, but some other contaminant, perhaps in the mustard oil itself. [For reference to this subject see this *Bulletin*, 1939, Vol. 36, pp. 908, 909; 1940, Vol. 37, pp. 750, 751, among others.] *H. Harold Scott.*

SARKAR (S. N.). **A Sensitive Chemical Test for the Detection of Argemone Oil. Part I. The Test and its Application to Dropsy-Positive Mustard Oils.**—*Ann. Biochem. & Experim. Med.* Calcutta. 1941. Vol. 1. No. 3. pp. 271–276.

LAL and his co-workers have described tests for detecting mustard oil which has been held responsible for setting up the symptoms of

epidemic dropsy [see this *Bulletin*, 1939, Vol. 36, p. 910 ; 1941, Vol. 38, p. 288]. By the nitric acid test of Lewkowitsch and Warburton a sample of oil which caused epidemic dropsy was found to contain 4 per cent. Argemone oil. The author states, however, that the test is not specific and may be given by many substances other than Argemone oil, and he proposes another which he claims is better, specific and more sensitive, detecting the oil in as small a proportion as 0·75 per cent. though the test is a qualitative one only. Its principle is that :

" Argemone oil when heated with ferric chloride solution in presence of strong hydrochloric acid and ethyl alcohol has been found to give an orange-red precipitate. If the conditions are favourable this precipitate may be obtained as a mass of beautiful orange-red fibrous crystals deposited at the bottom of the test tube or floating in the lower acid layer. They may also be seen collected at the acid-oil interface. Full details for carrying out this test are given below.

Experimental.

Reagents : 1. Concentrated hydrochloric acid.
2. Ethyl alcohol ; Rectified spirit preferable.
3. Ferric Chloride solution prepared by dissolving 10 g. of crystallised ferric chloride ($FeCl_3$, $6H_2O$) in 10 cc. of concentrated hydrochloric acid and 90 cc. of water.

Procedure :

" Two cc. of the oil to be tested is taken in a test-tube, 2 cc. of concentrated hydrochloric acid is then added, the contents mixed thoroughly and then heated in the water-bath kept at 92–95° for 2 minutes. Then 0·8 cc. of ethyl alcohol is added, the mixture shaken thoroughly and kept in the water-bath for 1 minute. Two cc. of ferric chloride solution is then added, the contents mixed thoroughly by shaking and the whole thing afterwards heated in the water-bath for 10 minutes."

The importance of this is that (if it is specific) three samples of mustard oil which had been incriminated as setting up the disease are shown not to contain argemone oil, at all events not in a proportion of 0·75 per cent. or higher, although previous workers had come to the conclusion that 4 or even 6 per cent. was necessary to cause the symptoms. *H. Harold Scott.*

SARKAR (S. N.). **A Note on the Preparation of Mustard Oil Resembling the Epidemiologically Incriminated Sample in Physical and Chemical Properties.**—*Ann. Biochem. & Experim. Med.* Calcutta. 1941. Vol. 1. No. 4. pp. 325–326.

'Ghani' cakes prepared from Argemone-free mustard seeds, if kept in a damp place, developed a surface growth of Monilia sp. These cakes are purchased cheaply and re-extracted to give about 6 per cent. mustard oil. Samples of suspected oil contain spores, which may be spores of this fungus. The fungus develops in stored mustard seed during the rains. Argemone-free mustard seeds were moistened and the mass inoculated with pieces of the infected cakes, and soon the fungal growth was observed. The seeds were then expressed and the samples of mustard oil obtained gave the nitric acid test of Lal and his co-workers. Therefore, if the nitric acid test is a criterion of toxicity, these products of fungus-contaminated seeds, without any admixture of Argemone oil, may be the causal agent of epidemic dropsy. More work is to be done. *H. Harold Scott.*

LAL (R. B.) & DAS GUPTA (A. C.). **Investigations into the Epidemiology of Epidemic Dropsy. Part XV. Incidence by Season.**—*Indian Jl. Med. Res.* 1942. Jan. Vol. 30. No. 1. pp. 145–154. With 4 graphs. [29 refs.]

It is a matter of common observation in Bengal that outbreaks of epidemic dropsy occur during and immediately after the rains, but reports show that they may occur during the winter and spring, some of them fairly extensive but generally not so large as the summer outbreaks. The authors quote the literature to demonstrate both these facts. CHOPRA and BHATTACHARJEE charted an ascent in July, reaching an acme in August and then falling sharply, but not touching the abscissa till April.

In a graph the number of cases (144) admitted to the Carmichael Hospital in the period January 1934 to 1940 are charted; this differs from that of Chopra and Bhattacharjee in that the ascent begins in June and the peak is reached in July and the decline is more rapid, but never touching the abscissa, and February shows a second small peak.

The authors apply these facts to the Argemone theory of the causation. The mustard crop is gathered in March, *Argemone mexicana* ripens in March or a little later; new mustard seed is on the market in April. During May and June the crushing is done and the new oil distributed; presuming the Argemone is toxic and is taken then, the three weeks' incubation period of the disease would lead to the rise in July. The fall subsequently may then be due either to less contamination by the Argemone or to the loss of toxicity due to exposure to light and air in the retail shops. The reason of the secondary spring rise is yet to seek. *H. Harold Scott.*

SPRUE.

HURST (Arthur). **The Pathogenesis of the Sprue Syndrome.**—*Guy's Hosp. Rep.* 1942. Vol. 91. (Vol. 21. 4th Ser.). No. 1. pp. 1–21. With 10 figs. [24 refs.]

Three constant characteristic features, common to sprue, non-tropical sprue and coeliac disease, require explanation:—

(1) Stools contain excess of split fat, but no excess of neutral fat, meat fibres or starch.

(2) The normal, feathery or herring-bone aspect of the duodenum and jejunum, produced by the valvulae conniventes on X-ray examination, is absent.

(3) No pathological changes are found in the intestines after death, provided post-mortem decomposition has been prevented.

Hurst claims that adequate treatment results in restoration of normal fat absorption and in reappearance of the normal radiographic aspects of the small intestine.

No adequate hypothesis has so far been put forward to explain these characteristics, but it is suggested that a satisfactory explanation can be founded upon a proper understanding of the modern physiology of fat-absorption (based upon VERZÁR & MCDOUGALL's *Absorption from the Intestine*, 1936).

The absorptive surface is greatly increased by the valvulae conniventes in the duodenum and jejunum, which give rise to the feathery or herring-bone appearances when visualized by X-rays after an opaque meal.

The villi number from 20–40 per sq. mm. and fat absorption is effected by rhythmical contractions of the villi (about six per minute). This in turn is brought about by stimulation of Meissner's plexus which innervates the muscularis mucosae.

The stimulus is provided by a hormone, villikinin, secreted (like secretin) by the duodenum and found in acid extract. Local application of crude yeast, or histamine, may also give rise to contractions. The synthesis of fat in the epithelial cells is a complicated process and is inhibited by adrenalectomy.

The constant abnormality in the stools of sprue, non-tropical sprue and coeliac disease is the presence of excess of split fat in the form of sheaves of colourless needle-shaped crystals of fatty acids and soaps, and absence of excess of neutral fats. These features can be recognized by microscopic examination of the stools.

The excess of gas in large and small intestines is not dependent on excess of undigested starch, but is probably the result of deficient absorption (as it is in vascular congestion of chronic hepatic, cardiac and vascular disorders).

The term " jejuno-ileal insufficiency " does not emphasize the specific nature of the insufficiency, *i.e.* the inability of the small intestine to absorb fat ; this, however, may also be present in intestinal carbohydrate dyspepsia, which is quite independent of the " sprue syndrome." " Sprue syndrome " is the best designation to include the group of disorders, in which hypocalcaemia, tetany, decalcification of bones, hypochromic or hyperchromic anaemia, stomatitis and glossitis are features.

In addition there is distension of small and large intestine with gas, and vitamin deficiencies are also present.

The hypocalcaemia is held to be the result of excessive calcium excretion in the stools, resulting from its combination with unabsorbed fatty acid. Moreover, any deficiency in fat soluble vitamins must also be a direct result of deficient fat absorption.

The flattening of the glucose tolerance curve is not probably the result of delayed absorption, but of disturbed carbohydrate metabolism. As regards the morbid anatomy, the inconstant changes, such as round-celled infiltration and occasional isolated ulceration may be the result of secondary infection or are probably attributable to prolonged irritation by new fatty acids. Especially important is the irritation by excess of soaps, which can be produced artificially in normal individuals by a soap and water enema.

Whenever all precautions are taken against post mortem decomposition, as in Thaysen's cases of tropical and non-tropical sprue, no macroscopic or microscopic changes are found in the mucosa or submucosa of the intestines. Similarly no changes have been found in the limited number of autopsies on coeliac disease.

As an explanation of the mechanism of the sprue syndrome it is suggested that paralysis of the muscularis mucosae would result in flattening or disappearance of the valvulae conniventes, which in turn would reproduce the characteristic radiographic appearances of duodenum and jejunum in tropical sprue, non-tropical sprue and coeliac disease.

Paralysis of the extension of the muscularis mucosae into the villi would result in cessation of the pumping action; consequently fat would cease to be absorbed, but the activity of the pancreas would remain unaffected.

The stools would consequently have an excess of split fat, but no excess of neutral fat, as in sprue and coeliac disease. In such a paralysis the microscopic appearance of the mucous membrane would remain unaltered.

The origin of this suggested functional failure might be due to various causes, including the absence of the constituent of the chyme which is the chemical stimulant of Meissner's plexus, or the result of vitamin deficiency, possibly vitamin B_2, since it has been shown that this vitamin in tropical sprue exerts a more favourable action than any other treatment.

There is no question that the abnormal radiographic appearances are due to presence of excess of undigested fat as they are present in the duodenum where fat digestion has hardly begun, and they are not present in those cases of the sprue syndrome associated with disease of the mesenteric glands, and obstructions of the lacteals, where hindrance to fat absorption occurs at the level of these glands, instead of in the villi.

[See also LEITNER, this *Bulletin*, 1942, Vol. 39, p. 497.]

P. Manson-Bahr.

RODRIGUEZ OLLEROS (A.). Analogias y diferencias gastrologicas entre el espru tropical y la anemia perniciosa. [**Similarities and Differences in Gastric Conditions between Sprue and Pernicious Anaemia.**] —*Bol. Asoc. Med. de Puerto Rico.* 1942. Apr. Vol. 34. No. 4. pp. 128–133. [29 refs.]

Achlorhydria, even after histamine, is acknowledged to be a usual feature of pernicious anaemia, whereas it is observed in some 30 per cent. only of cases of tropical sprue. The author discusses this with other points to demonstrate gastrological analogies and differences between the two conditions. In this article he deals with (1) Bacteriology of the gastric contents; (2) The appearances seen by gastroscopy, and (3) The excretion of neutral red by the gastric mucosa, which he designates chromoscopy.

Under the first, whereas in normal conditions the low *p*H of the gastric juice prohibits bacterial growth and the contents are sterile, in sprue and in pernicious anaemia growth of Gram-negative organisms is common and, in the former, Gram-positive also. Thus, in 25 cases of sprue, both were found in 14, Gram-negative only in eight, Gram-positive in one, and two were sterile. Only two showed histamine-resistant achlorhydria.

As for gastroscopy, there is some degree of atrophic gastritis, but whereas in pernicious anaemia it may be generalized but more marked in one area than in another, in sprue it is hardly ever so intense as in pernicious anaemia and rarely if ever generalized. Also, since a much smaller proportion of sprue cases had achlorhydria, in this disease the atrophic condition was not accompanied by loss of function as it is with pernicious anaemia.

The author maintains that in gastric atrophy the spontaneous secretion of free HCl is the first to go, then its secretion though histamine

is given, next secretion of total chlorides, and lastly the power of excreting neutral red. The test for this last is carried out as follows :—

A fractional test of the gastric secretion is made, after the patient had fasted for 12 hours, by giving him 0·2 gm. caffeine in 300 cc. water coloured with two drops of a solution of methylene blue. When this has left the stomach, 5 cc. of 1 per cent. neutral red are injected into the buttock (if there are indications that there is no spontaneous secretion of free HCl, histamine is injected subcutaneously at the same time). Thereafter the gastric contents are extracted every five minutes till a red coloration indicated that the stomach had begun to excrete the dye.

In cases of pernicious anaemia this faculty is lost, states the author, but in sprue, though it may be delayed in action, it is never lost. In normal persons in the tropics the excretion began in 14·7 minutes in those with normal acidity, in 16·6 minutes in those with hyperacidity and in 24 minutes in those with hypoacidity [in a table this is called hyperacidity—an obvious mistake]. In three suffering from tropical sprue, the corresponding times were 12·4, 13·7, 14·4 minutes, and in those with anacidity 24·2 minutes. The author maintains, therefore, that this neutral red test may usefully serve to distinguish the anaemia of sprue from true pernicious anaemia. *H. Harold Scott.*

HAEMATOLOGY.

DIGGS (L. W.) & PETTIT (V. D.). **A Comparison of Methods used in the Detection of the Sickle-Cell Trait.**—*Jl. Lab. & Clin. Med.* 1940. Vol. 25. pp. 1106–1111. With 4 figs.

From a comparative study of different methods, the authors conclude that the most reliable and the most practical means for detection of the sickle cell trait which has yet been devised, is the moist stasis method of SCRIVER and WAUGH [this *Bulletin*, 1931, Vol. 28, p. 845].

In this method stasis is produced by means of a rubber band placed about the proximal portion of the finger for five minutes. With the band still in place the end of the finger is then pricked and a fresh drop of blood is sealed on a slide under a cover slip, and examined microscopically. The drop should be sealed as quickly as possible, as exposure to the air favours reversion of the distorted cells to normal shape. *F. Murgatroyd.*

VANCE (B. M.) & FISHER (R. C.). **Sickle Cell Disease. Two Cases, one presenting Fat Embolism as a Fatal Complication.**—*Arch. Pathology.* 1941. Sept. Vol. 32. No. 3. pp. 378–386. With 2 figs. [17 refs.]

The abnormal semilunar cells of sickle cell disease are destroyed by the body defences and the destruction is sometimes sufficiently extensive to be the cause of severe haemolytic anaemia. The difficulty presented to the passage of the abnormally shaped cells through the capillaries may also produce stagnation, thrombosis and endarteritis in the finer vessels with consequent necrotic and ultimately fibrotic changes in tissues supplied by such affected vessels. Clinical signs include abdominal pain, nausea, vomiting, migratory pains in the

joints, signs of cardiac distress, and persistent non-varicose ulcers may appear on the legs. Haemolytic cases may be icteric, and death may occur early either from severe anaemia or from some intercurrent infection.

A fatal case of haemolytic anaemia is described, and is particularly unusual in that it occurred in a boy of Greek parentage. The majority of cases of sickle cell disease reported in the United States are in negroes, and it is estimated that 7·5 per cent. of that race exhibit the condition, but there are insufficient data to judge accurately the frequency of the occurrence and the extent of the disease throughout the world.

Pathologically, the early changes are due to congestion of the organs and lysis of the abnormal cells by the reticulo-endothelial system. The spleen is chiefly affected and is large and dark purplish red, with a thin capsule and smooth surface. Perivascular haemorrhages from the terminal portions of the splenic arterioles and dilation of the capillaries of the malpighian bodies occur, with the formation of small pools of blood. In more chronic cases organization of these haemorrhagic extravasations occurs which, together with the vascular changes and infarcts, lead to the destruction of the normal tissue, so that the organ may shrink to an atrophic nodular mass weighing only a few grammes. Changes of a similar pathological type may occur in other organs, including the bone marrow. At first the marrow is cellular and congested, with haemorrhages between islands of regenerating cells; nucleated sickled cells have been described. Later, thromboses, necrosis and sclerotic changes occur. Fat embolism may follow focal necrosis of the marrow, and such a fatal case is described.

The patient, a negro woman, had severe pain low in the back, for which she took an unknown quantity of aspirin and barbiturates. She became comatose, and was admitted to hospital, where she died on the second day. At autopsy, sickle cell disease with splenic atrophy was found. There were necrosis and haemorrhages of the marrow, with pulmonary fat embolism and fat emboli in the kidneys, cerebral cortex and myocardium. *F. Murgatroyd.*

CONNELL (John H.). **Cerebral Necrosis in Sickle Cell Disease.**—*Jl. Amer. Med. Assoc.* 1942. Mar. 14. Vol. 118. No. 11. pp. 893–895. With 2 figs.

Various clinical manifestations associated with sickle cell anaemia have been recognized but systemic complications are probably much commoner than is usually realized, and only a few cases with involvement of the central nervous system have been recorded.

The case described is that of a negro woman aged 20, admitted to hospital with a temperature of 100°F., a pulse rate of 68 per minute, drowsiness, vomiting, headache, and right-sided deafness; she also had a residual weakness of the left arm and leg dating from an illness six years before. Three days after admission she suddenly became comatose, the temperature rose to 104·6°F., and the pulse rate to 150 per minute, the left pupil was then larger than the right, there was stiffness of the neck, all reflexes were diminished or absent, and the patient died 12 hours after the onset of the coma. At autopsy there was massive necrosis of the left cerebral hemisphere with a firm red clot in the left middle cerebral artery; an old cystic pigmented lesion was found in the right cerebral hemisphere and another in the right

cerebellar lobe. All the vessels of the brain were filled with greatly distorted sickled red blood cells. The spleen appeared to be a brown fibrotic piece of tissue weighing only 2 gm. Blood smears revealed a severe degree of sickling.

Sicklaemia, or the tendency of the blood to sickle, is a constitutional tendency to abnormal erythropoiesis, resulting in the production of elongated semilunar erythrocytes which are destroyed by the body defences as abnormal cells, but the anaemia is seldom severe, and rarely the cause of death.

The more important factor is that the abnormally shaped cells are poorly adapted to pass through the circulation. Cells stagnate in certain parts of the blood stream, particularly in any organ with a terminal circulation, and obstruction follows, producing local anoxaemia, which in turn causes still further alterations in the shape of the cells. The smaller arterioles become occluded and consequent thrombosis terminates in local ischaemia and necrosis.

The importance of routine testing of negro patients' blood for sickling is stressed, and the author believes that the process described, especially when occurring in the central nervous system, is not infrequently overlooked or misinterpreted. He regards the acute necrosis of the brain in the present case as due to such a complication; and the patient's previous illness, the old cystic lesions of the brain, and the condition of the spleen, as evidence of its previous occurrence.

F. Murgatroyd.

VENOMS AND ANTIVENENES.

GHOSH (B. N.), DE (S. S.) & CHOWDHURY (D. K.). **Enzymes in Snake Venom.**—*Ann. Biochem. & Experim. Med.* Calcutta. 1941. Mar. Vol. 1. No. 1. pp. 31–42. [20 refs.]

"It is now recognised that the proteinase of animal origin can be classified in three groups, based on their activity in media of different *p*H.

"i. A proteinase which is active in distinctly acid range is called pepsin.

"ii. That which is active in slightly alkaline range with an optimum at about *p*H 8·0 is called trypsin.

"iii. That which shows optimum activity in the neighbourhood of *p*H 5 is called kathepsin."

The authors have investigated the enzymes of *Naja naja, Viper, russellii, Bungarus fasciatus* and *Echis carinata* in various ways using egg albumen and gelatin as the media. In tests at various degrees of *p*H the results indicate that the proteinase of all is probably trypsin, and the same indication is obtained from experiments on the critical temperature of inactivation of the enzyme.

The venoms of *N. naja, B. fasciatus* and *E. carinata,* previously heated, increase the activity of trypsin; the venoms of *B. fasciatus* and *E. carinata,* even if not heated, activate inactivated trypsin, but the venom of *N. naja* (unheated) and that of *V. russellii* (heated or unheated) appreciably inhibit the activity of trypsin.

All these venoms can hydrolyse peptone at optimum *p*H of 8·4. Dipeptidase is present in all, capable of hydrolysing glycylglycine

and *l*-leucylglycine; polypeptidase, capable of hydrolysing the *laevo*-rotary, but not the *dextro*-rotary form of leucylglycylglycine, is present, and carboxypolypeptidase is also detected.

Choline-esterase activity is possessed markedly by the venoms of *N. naja* and *B. fasciatus*, but those of *E. carinata*, *V. russellii* and *Crotalus t. terrificus* show no such activity. It has been suggested that the neurotoxin of cobra venom is probably identical with choline-esterase, but the authors have found that purified cobra neurotoxin does not possess choline-esterase activity, and that crude venoms of *N. naja* and *B. fasciatus*, when heated at 60–70° for 30 minutes, lose their choline-esterase activity, while their neurotoxic activity remains practically unaltered.

Haemolysin has been separated from the enzymes; it has strong lecithinase activity but contains no other enzymes.

Details are given of the experiments on which these conclusions are based, but for these the reader must consult the original paper.

[Opportunity may here be taken of welcoming this new journal and of congratulating the editors on the high standard of work presented.] *C. W.*

CHAUDHURI (N. K. ROY) & GHOSH (B. N.). **Neutralisation of *Vipera russellii* Venom by the Homologous Anti-Serum.**—*Ann. Biochem. & Experim. Med.* Calcutta. 1941. June. Vol. 1. No. 2. pp. 169–174.

"(1) The doses of anti-serum required to neutralise various multiples of 1 d.c.l. of *Vipera russellii* venom have been determined and it has been observed that the amount of anti-serum required to neutralise 5 d.c.l. of venom is much greater than five times the amount of serum neutralising 1 d.c.l.

"(2) It has been observed that up to a level of 20 d.c.l. the relationship between the dose of venom and that of serum required to neutralise the venom is approximately linear.

"(3) When a given volume of anti-serum against *Vipera russellii* venom is diluted with physiological saline, its potency is found to vary inversely with the dilution indicating thereby that neither the total number nor the activity of the antibody molecules or micelles is affected by dilution."

TAOUBES (G. A.). [**Treatment of Snake-bite by Novocaine Block.**]—*Khirurgiya.* Moscow. 1941. No. 4. pp. 118–122. [In Russian.]

The author describes the results of treatment of bites by the European viper (*Vipera berus*) by novocaine block. The total number of patients dealt with was 12, their ages ranging from 14 to 50. The site of the bite was in the upper and lower extremities (six cases of each), the symptoms being severe in all cases. An account is given of the symptoms observed, and the methods of treatment usually employed are critically examined.

The present cases were all treated by a circular block with from 100 to 200 cc. of 0·5 per cent. solution of novocaine, according to the age of the patient and the site of the bite. When the upper limb was affected the block was applied to the upper third of the upper arm, whereas in the case of the lower limb it was applied to the upper third of the thigh. Eight cases were treated 1½ 3 hours after the bite, while

in other cases the interval was from seven hours to three days. As the result of treatment the oedema subsided from one to four days later, the general symptoms of intoxication rapidly disappeared, and there was an improvement in the blood picture and in the composition of the urine. The duration of the disease in the treated cases was from one to five (average 2½) days, as compared with periods exceeding one month in untreated cases. The circular novocaine block is thought to render the nervous system insusceptible to the action of snake venom, and, in view of the successful results obtained, the author recommends this treatment for all forms of snake-bite involving the nervous system.

C. A. Hoare.

[If this view is correct, it would be interesting to see the effect of novocaine block in cases of bite by members of the family Colubridae.—*Ed.*]

KIRBY-SMITH (H. T.). **Black Widow Spider Bite.**—*Ann. Surgery.* 1942. Feb. Vol. 115. No. 2. pp. 249–257. [56 refs.]

The author reports 24 cases, with one death (in a man of 69) but points out that in 248 cases recorded in the literature no deaths occurred, though in another series reported by BOGEN, in which information was collected from death certificates, newspaper reports and personal communications, the fatality rate was 6·6 per cent.

In the present series 16 patients were bitten in outside privies; most of the bites were on the penis, scrotum or buttocks. The patients usually suffer great pain, which begins in the muscle groups nearest the bite and spreads to the abdomen. The abdominal muscles are board-like, but there is movement with respiration; temperature is normal and pulse and respiration may be somewhat increased. The average duration of pain is about 24 hours. The condition closely simulates an acute abdominal lesion, and in one case laparotomy was performed in a patient, with a history of peptic ulcer, who did not at first say that he had been bitten. No abnormality was found within the abdomen and he later remembered the bite. [See also this *Bulletin*, 1936, Vol. 33, p. 401.]

Latrodectus mactans is a common spider in the United States, but does not readily attack man. The amount of venom is small, but it has been stated to be 15 times as toxic as that of the rattlesnake. In treatment morphia is only moderately useful; magnesium sulphate solution (10 per cent. intravenously or 25 per cent. intramuscularly) and calcium gluconate solution (10 cc. of 10 per cent. intravenously) are of some value. Serum treatment is being developed, and the author details a case in which it was apparently very effective. *C. W.*

MISCELLANEOUS.

CORR (J. F.). **Treatment of Heat Pyrexia by Lumbar Puncture.** [Memoranda.]—*Brit. Med. Jl.* 1942. June 20. pp. 761–762.

This is an interesting account of a case of heat hyperpyrexia, one of five which occurred on board ship during very hot weather, when the temperature between decks was commonly 115°–120° F., and in the engine-room about 140°F. The patient's temperature rose, in spite of sponging with iced water, to 109°F., and he was then placed into an improvised ice bath. He was unconscious. The fall of temperature was rapid, and though the bath was ordered to be discontinued when the patient's temperature reached 101°F., a slight delay resulted in a condition of collapse during which his temperature fell to 97°F. It was therefore necessary to apply hot bottles for a time, and this was followed by convulsions as pronounced as those which occur in tetanus. These were controlled by ether anaesthesia, and lumbar puncture performed at the same time showed that the cerebrospinal fluid was under tremendous pressure. About 2 oz. of clear fluid was withdrawn in half an hour, until the pressure was normal. One pint of water was injected into the rectum and retained.

The temperature rose again later but was controlled with the ice bath, and thereafter the patient steadily recovered. In all the other patients there was muscle twitching, and one became unconscious; all recovered and were perfectly well as soon as a cooler climate was reached. *C. W.*

KAMPMEIER (R. H.) & LARSEN (R. M.). **Elephantiasis due to Lymphopathia Venereum. A Note as to its Significance and the Effect of the Sulfonamides.**—*Amer. Jl. Syph.* 1942. May. Vol. 26. No. 3. pp. 316–329. With 9 figs.

Lymphogranuloma inguinale has long been recognized as a cause of elephantiasis and STANNUS attributed it to a "retrograde thrombotic lymphangitis" originating in the lymph glands. The value of sulphonamides in the treatment of L.i. is now established, but they do not appear to have been greatly used for the treatment of the elephantiasis which it may cause. The authors of the present paper report three cases of long standing, in two of which this form of treatment was successful.

In the first the infection was of eight years' duration, with many fistulae, rectal and vaginal stricture and a rubbery swelling of the right labium. The condition appears to have improved very considerably after three months' treatment with sulphanilamide, and two years later all the fistulae were found to have healed. The condition then relapsed, but cleared up again under one month's treatment with sulphathiazole.

In the second case the disease had existed for seven years, and by then both labia had become so large as to interfere seriously with walking and sitting. Sexual intercourse had been impossible for five years, and there was rectal stricture. Sulphanilamide at the rate of 2·6 gm. a day caused rapid improvement, and was continued for three months. A year later the induration of the labia and surrounding skin was found to have completely subsided though there was still

some enlargement of the labia minora and the clitoris, and a rectal stricture; sexual intercourse had been resumed about six months previously after a lapse of six years.

The third case was a man with an elephantiasoid condition of the penis and scrotum of nine years' duration. He had had a urinary fistula for four years. Sulphanilamide treatment failed to relieve the condition.

The author discusses the cause and concludes that the enlargement, etc., must have been due to active inflammatory rather than cicatricial changes in the two first cases. In the third case a biopsy, not performed on the first two, showed considerably more fibrosis than is usually seen in an active case, a photomicrograph of which is shown for contrast. The authors think that the fact of the condition having passed to one of cicatrix (they describe the subcutaneous tissue as resembling a keloid) accounts for its failure to respond to sulphonamide treatment.

As a result of their experience they consider that in such cases thorough treatment with sulphonamides is indicated before operation is undertaken. *L. W. Harrison.*

RÖPKE (F.). Zur Ätiologie des Kröberschen Krankheitsbildes.—[**The Aetiology of Kröber's Disease Syndrome.**]—*Deut. Trop. Ztschr.* 1942. Feb. 1. Vol. 46. No. 3. pp. 69–71.

In 1933 and 1939 KRÖBER [this *Bulletin*, 1940, Vol. 37, p. 226] described a disease of male natives of the west shore of Lake Victoria Nyanza characterized by urethral discharge, fistulae in the neighbourhood of the perineum and scrotum, great distortion of the urethra and an elephantiasoid condition of the parts. The condition begins with a purulent urethral discharge which becomes complicated by extensive periurethral abscesses and fistulation. In this respect it may not be very different from some sequelae of gonorrhoea, but the distinctive feature is the tendency to the formation of nodules and tumours at the mouths of the fistulae. Röpke mentions that a similar condition has been described by JUNGE in Liberia. The author has seen only a few cases in the plains near to the Usambara highlands and does not know if the patients were really natives of those parts. He is chiefly interested here in the cause and discusses the various possibilities. He suggests that a special organism might be responsible, such as a fungus like the ray fungus, perhaps introduced by the straws which natives use to cope with urethral stricture, but all investigations in this respect have had negative results. He rules out lymphogranuloma inguinale, tuberculosis and bilharzia. In regard to the last, he says that bilharzia is common in those parts but this disease is rare, and that no ova have been found in these cases. He does not dismiss gonorrhoea as an original cause but thinks that other germs completed the mischief; he wonders if para-urethral canals, which seem to play an important part in the aetiology, are more common in natives than in whites. The labyrinthine development of the fistulae and the tendency of the condition to spread are not like the fistulous condition resulting from simple gonococcal infection, which is very common in those parts. He favours the idea that *Wuchereria bancrofti*, which is fairly common there, may prepare the way for the subsequent lymphatic obstruction responsible for the elephantiasoid condition. Finally,

he says that the condition requires much more investigation and in particular it is necessary to discover its geographical distribution.

L. W. Harrison.

READ (Margaret). **Migrant Labour in Africa and its Effects on Tribal Life.**—*Internat. Labour Rev.* 1942. June. Vol. 45. No. 6. pp. 605–631. With 1 map & 1 diagram. [Refs. in footnotes.]

The emigration of labour is related to the African's "love of adventure" and "desire to travel" and to the traditional method of agriculture by "shifting cultivation"; its importance in Nyasaland is shown by the fact that the country's chief export for the past 50 years has been men. An estimate made in 1939 revealed that nearly a quarter of the total male adult population was abroad. The present survey covers 110 villages in six areas in the Northern Province of Nyasaland; of 3,818 adult males, 33 per cent. were away at the time of the survey and 49 per cent. had formerly been away. These conditions make for "economic disequilibrium"—"urban areas grow richer, rural areas grow poorer and the *same Africans have a footing in both* and the increasing maladjustment is only too obvious." No correlation was found between the numbers of absent males and the standard of diet and of housing. One reason given for the absence of effect of emigration on standard of food is that food rations are considered as wages and money is spent, not on more and better food, but on clothes and houses. Abnormal conditions of family life are created.

In regard to the effect on women there are two schools of thought—one holding that there can be little objection to controlled emigration if women are considered as mothers, are brought presents and clothes and if babies are born in the village; the other school treats the situation more realistically—one old chief said "a woman wants a man to live with more than the presents he gives her." The women, under pressure of work, become disheartened and careless. There are also repercussions affecting tribal authority; the lazy and unenterprising males are left behind in the villages and the young men with changed views return from abroad and may not support their chiefs. Fears are expressed for the success of "indirect rule" built on these unsatisfactory foundations.

B. S. Platt.

REVIEWS AND NOTICES.

IOFF (I. G.) [**Questions of the Ecology of Fleas in Connexion with their Epidemiological Significance.**]—116 pp. With 9 text figs. [332 refs.] 1941. Piatigorsk: Ordžonikidze Regional Anti-Plague Station. [5 roubles.] [In Russian.]

Since the pioneer work of VERJBITSKI (1902-3) on the transmission of plague by fleas Russian investigators have continued to make valuable contributions to our knowledge of the epidemiology of this disease. Particular attention has been given to the study of fleas parasitic on wild rodents, and of the part played by the former as vectors and of the latter as reservoirs of the human disease in the endemic regions of the Soviet Union.

In the present work the author has brought together all the available data on the biology and ecology of fleas in relation to their epidemiological significance, especially in plague. Only a brief survey of the contents can be made in a review, but it is sufficient to give an idea of the mass of information contained in this book.

An introductory section deals briefly with the epidemiological rôle of fleas in general. This is followed by a consideration of the behaviour of various infective organisms after ingestion by fleas, including the susceptibility of these insects to infection. The data on transmission of diseases by fleas are summarized in one table, while another records the maximum periods of survival of different species of rodent fleas (from suslik and tarabagan marmots) when infected with plague bacilli. Further a description is given of the different methods of transmission of infections by fleas, while a special section is devoted to an evaluation of various species as vectors of plague (and some other infections) in connexion with their physiological and ecological peculiarities. Among the rodent fleas found in enzootic regions of U.S.S.R. the following represent experimentally proved vectors of plague: *Oropsylla silantiewi* (from tarabagans); *Ceratophyllus* (*Citellophilus*) *tesquorum* and *Neopsylla setosa* (from susliks); *Ceratophyllus* (*Nosopsylla*) *mokrzeckyi* and *C.* (*N*) *consimilis* (murine). A chapter is devoted to the habitats (hosts and their dwellings) and general bionomics of the adult and larval fleas. Other sections deal with the feeding habits and host-parasite relationships of Aphaniptera, their geographical distribution and the influence of climatic factors upon their bionomics. In connexion with the feeding habits, the author records in a table the results of his own observations on the ability of fleas from various animals to bite human beings. Data are provided regarding the duration of life in fleas in its bearing on the preservation of infection (especially plague) in them. A chapter is devoted to locomotion and migrations in these insects; this is followed by an account of the fluctuation in the numbers of flea populations and of the factors involved, and finally the natural enemies and methods of destruction of both fleas and their rodent hosts are dealt with.

It should be emphasized here that throughout the entire description the various facts concerning fleas and their ecology are closely correlated with the epidemiology of plague.

There are only nine text figures (mostly photographs), the value of which is somewhat diminished by defective reproduction. The bibliography comprises 332 titles (including 154 Russian papers). An alphabetical index is lacking, but this is to some extent compensated for by the provision of a very comprehensive table of contents.

There can be no doubt that this book will serve as a useful guide to all those who are engaged in anti-plague work—medical officers, bacteriologists and entomologists—as well as to ecologists in general. Non-Russian workers will probably appreciate the compilation of local data which are not readily accessible in the scattered original publications. *C. A. Hoare.*

HARLEY (George Way) [M.D., Ganta Dispensary, Liberia]. **Native African Medicine. With Special Reference to its Practice in the Mano Tribe of Liberia.**—pp. xvi+294. With 1 plate & 1 map. 1941. Cambridge, Mass. Harvard University Press. [21*s.*]

In his introductory note Carleton S. COON, Assistant Professor of Anthropology at Harvard University, remarks on the author's "rare

ability to live in and describe a second world." Dr. Harley, a Native American, has done this with great insight, accuracy and completeness, after years of medical practice among the Mano people of Liberia.

Thanks to anthropological studies at the Kennedy School of Missions before he sailed, which taught him not to regard the native medicine man as a devil doctor and epitome of everything evil, sinister and reactionary, and also to a course in Tropical Medicine at the London School and Botanical Studies at Kew, he and Mrs. Harley prepared themselves for a serious task. As a medical missionary he was an anthropologist who stayed long enough to accomplish it.

He has read widely, and reviews in a supplementary chapter the subject in Africa as a whole. But his findings and conclusions among the 200,000 Mano are remarkably true and typical.

The primitive African starts from the conviction that disease is unnatural, and results from intrusion from outside. Without it man might live for ever. Being logical he must ask the question why and whence it comes, and has to hazard an answer without scientific knowledge of cause and effect. Common diseases ("Oh, everybody has that!") do not excite speculation, and are treated more or less rationally by the sufferer and his family. Less common conditions require the help of a neighbour or specialist, while the more obscure or deadly can only be dealt with by a diviner. Finally, the poison ordeal is the super-specialist in diagnosis, but is also judge, jury and often executioner as well.

Medicine (*nye*) is defined as man controlling nature. This can be done by using the spirit or power in animate or inanimate objects. The particular virtue of such power may be suggested by its property of strength, endurance or shape, or by its stimulation of the sense of taste, touch or smell which has probably accounted for its selection among thousands of competitors for a place in the Pharmacopoeia. Thus a sort of homoeotherapy is evolved, based on the homoeopathic principle that like cures like, though the resemblance may be only superficial; it serves to show how suggestible are doctors in all ages.

The spirit world, however, constitutes the all-important addendum to the Pharmacopoeia, and magical causes need magical remedies.

Perverted or degraded *nye* is medicine used for antisocial purposes, *e.g.*, witchcraft.

Harley rightly emphasizes that witchcraft is the African's explanation of unknown disease. It is not a cause of disease, even by suggestion, though the author admits that the fear of it may contribute to the patient's morbid condition. Where witchcraft is a genuine pathological agent it acts simply by poisoning.

Treatment is described under the three headings of rational, magical and mixed, but the distinction is difficult and is not made by the natives.

The good doctor (*zo*) is one who has good medicine, though qualifications, either hereditary or acquired, are expected also. Women are the general practitioners and men usually the specialists. These men and women have a vast store of knowledge and practical sense, mingled with sheer nonsense. Of the former a bark found to contain quinine and given for fever, and the inoculation of powdered snake head to immunize against snake bite are examples, while eating rice in which a frog has been boiled is the senseless homoeotherapeutic remedy for curing the croak of whooping cough.

Divination is critically analysed and exposed. The Sasswood ordeal is described in detail, and the specialized medicine of the male and female initiation ceremonies and of the Snake societies is outlined.

Botanical lists and names are given throughout, and a full index and bibliography complete a most readable and informative volume which should be in the hands of every medical man and most others called to live and work among Africans. *C. C. Chesterman.*

SNAPPER (I.) [Professor & Head of the Dept. of Medicine, Peiping Union Medical College]. **Chinese Lessons to Western Medicine. A Contribution to Geographical Medicine from the Clinics of Peiping Union Medical College.** With a Foreword by George R. MINOT, Professor of Medicine, Harvard University.—pp. x+380. With 132 figs. 1941. New York: Interscience Publishers, Inc., 215 Fourth Avenue. [22/-]

The title of this book is somewhat misleading. It suggests that its contents refer to China as a whole, whereas it is based almost entirely on experiences in North China (Peiping).

Dr. George Minot contributes the foreword and points out that, while certain medical institutions have been established in China to convey the knowledge of Western Medicine to the East, it has only recently been realized that China has much to contribute to the West.

The first Section, dealing with conditions of avitaminosis and calcium imbalance, receives considerable attention. This is quite right and proper, for osteomalacia and its allied conditions are remarkably prevalent in North China.

A large section is devoted to Infectious Diseases including insect-borne diseases.

Malaria is only just referred to but the author points out that while natural infection with the subtertian parasite is very rare in North China, the disease is frequently conveyed by injections in heroin dens. It is common for heroin addicts to receive the drug by direct injection into a vein and frequently there is no attempt to sterilize the syringe. Rabies is included in infectious diseases while tuberculosis is given a separate chapter of ten pages.

An interesting chapter is that on Diseases of the Liver. Banti's syndrome, first described in Northern Italy, is found in North China and the details of several cases are described.

The various types of anaemias met with are carefully noted and attention is drawn to the peculiar incidence of pernicious anaemia in North China. The author points out that DE LANGEN and LICHTENSTEIN affirm that pernicious anaemia is very rare in Malayans and port Chinese. He states that it does occasionally occur in the well-to-do and records given in this book appear to confirm this view.

This book is a valuable contribution from North China, is most interesting and has the advantage of a good index.

H. Gordon Thompson.

BARBER (C. H.) [D.S.O., M.A., D.M. (Oxon.), M.R.C.S., L.R.C.P., etc.]. **Tropical and Sub-Tropical Diseases.** Oxford War Manuals. General Editor: The Rt. Hon. Lord HORDER, G.C.V.O.—pp. x+189. With 29 figs. 1942. London: Humphrey Milford, Oxford University Press. [5*s*.]

The object of this book is "to supply in concise and portable form the up-to-date salient facts required by those who are up against

tropical and Oriental diseases." It is concise and portable, indeed it fits the pocket, but much of the information given is not up to date, and there are many omissions, some of them important. There is a list of countries and the diseases prevalent in them, yet in Algiers and Egypt there is no mention of typhus, though this disease appears under the heading of North Africa and Libya. There is no mention in this section of malaria in the Pacific Islands, of cholera in Siam, of plague in Egypt or of yellow fever in the Sudan. In Malaya tick typhus is noted but there is no mention here of flea or mite typhus.

In general, the descriptions of disease are very brief, and suffer accordingly, though no doubt much of the information is accurate. On the other hand there is little excuse for some of the errors and omissions: *Anopheles costalis* has been known for many years now as *A. gambiae*; NNN medium is described as "Agar, sod. chloride and water," with no mention of blood; there is no reference to *Glossina tachinoides* in the spread of trypanosomiasis; it is said that the tsetse fly does not stray far from water, a statement which, of course, does not apply to *G. morsitans*; thyroid enlargement is given as a symptom of Chagas's disease, though most authorities have long considered that there is no causal relationship between the endemic goitre and the trypanosomiasis, which happen to coincide; the sulphonamides are constantly referred to as the sulphanilamides—for instance "the sulphanilamides in the form of sulphapyridine"; in the theories of causation of sprue are included the dry rot and Monilia theories, surely now long dead; *Wuchereria bancrofti* is described as "Filaria Bancrofti (or Wüchereri)", and its transmission is said to be due to "the *Stegomyia mosquito*, or Culex fatigans (*Aëdes variegatus*)"; there is no mention of *W. malayi*.

There is lack of uniformity in nomenclature and in the italicizing of specific names; the names E. histolytica and E. coli and A. Hist. and A. Coli. appear on the same page. The illustrations are all line drawings, and are not good.

It is not easy to write a short account of tropical medicine, but in spite of the fact that some of the clinical descriptions in this book are adequate, and that reference is made to a considerable amount of recent work, the reviewer is left with the impression that this work is not enough to meet the requirements of those going to the tropics, and that it does not present the subject in such a manner as to make sufficiently clear the broad principles which facilitate understanding.

C. W.

Piney (A.) [M.D., M.R.C.P., Physician, St. Mary's Hospital for Women and Children, London, etc.] **Synopsis of Blood Diseases.**—pp. ix+120. With 1 chart & 4 coloured plates. 1942. London: William Heinemann, Medical Books, Ltd. [10*s.* 6*d.*]

After a brief account of blood formation the author describes the classical megalocytic, hypochromic and haemolytic anaemias. Then follow descriptions of the anaemias of infancy and childhood, hypoplasia of the blood-forming organs, the haemorrhagic diseases, the leukaemias, polycythaemias and the diseases of the spleen. Succeeding chapters deal briefly with symptomatic blood changes and the blood pictures encountered in various infections, but in this section there are some unexpected omissions, as for example, the comparative

leucocyte counts in infective hepatitis and Weil's disease, which are so useful in early clinical differential diagnosis. A glossary of haematological terms, a few references and two tables giving the characteristics of the various blood and marrow cells terminate the book. Four coloured plates are given but their impressionistic style limits their value. The author states the book is intended to give as much information as the average physician and general practitioner will need; it will form a useful and handy book of reference in routine practice.

F. Murgatroyd.

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